

May 1989

Vol. 2 N° 8

Price £1.80

Archive

The Subscription Magazine for Archimedes Users



Graphics Utilities

Connecting a Trackerball


Two new Competitions

SYS and other FX (Effects)

Languages, First Word Plus & BASIC V Forums

Reviews: DiscTree, Wingpass Macro Assembler,
Digi-Sim Circuit Simulator, Ancestry, Emacs editor.

Hints and Tips, Help!!!, Comments etc, etc.



A note of optimism?

How are things going in the Acorn camp? Well, there has been (quite rightly) a lot of moaning about the non-supply of RISC-OS – mind you, they are dribbling through now – but I personally felt very let down over the whole thing. I was lead to believe, by various people, that RISC-OS was going to be available in bulk, on time. It **was** available on time, but very definitely **NOT** in bulk. At the time of writing (1st May) we have had about 260 of the 1,300 sets we ordered but Acorn are still saying we will have them all by the end of May. I hope so.

Still, don't let's allow that to divert our attention from the fact that we now have a **very** powerful operating system for the Archimedes. We also have three new machines promised... nay, four!

The 410/1, 420/1 and 440/1 now have prices and specifications, though we are still waiting to hear from anyone who has actually taken delivery of one. (Let us know if you see one!) The prices are low enough, provided Acorn can actually ship the things, to entice quite a few new people into the Archimedes market. A310 owners may feel a little hard done by when they compare what 400/1 purchasers will get with what they (we) got for our money, but then, I suppose that price reduction combined with performance increase is what we should have learned to expect from the computer industry. In any case, an increase in the number of Archimedes owners can only be good for current Archimedes owners as it entices more software and hardware manufacturers onto the scene.

Then, in the next few days, Acorn will be announcing their new mini-Archimedes, Amiga basher, or whatever you want to call it. The June issue of Acorn User will have the low-down on the new machine, so watch out for it.

Strange, isn't it?

Steve Bruntlett, in his review (Archive 2.6 p 17) concluded, effectively, that Art Nouveau at £42.50 was almost as good as Pro-Artisan at an Archive price of £143 and yet Pro-Artisan is **still** selling much faster than Art Nouveau. I suspect that C.A.L. have **under-priced** Art Nouveau so that people are thinking it can't possibly be any good because it is so cheap. Strange, isn't it?

Free tea and biscuits!

Anyone who lives within striking distance of Norwich and who would like to see how the Archive magazine is put together (admittedly on a Macintosh II) is very welcome to pop in to the Craft and Flower Festival at Holy Trinity Church, Essex Street, Norwich – I will be there on Friday and Saturday 12th/13th May from 10 a.m. to 4 p.m. demonstrating the craft of DTP. You will find me upstairs next to the tea stall, (I organised that well, didn't I?) so if you make yourself known as a subscriber, there will be free tea and biscuits courtesy of Norwich Computer Services.

Cheers!
Paul B.

Archive

Volume 2 • Nº 8 • May 1989

Contents

Products Available Now	2	Connecting a Tracker Ball	26
Forthcoming Products	3	Languages Forum	28
Comments Various	5	First Word Plus Forum	30
Small Ad's	8	Emacs – A Text Editor	36
Hints & Tips	10	BASIC V Forum	38
RISC-OS Hints & Tips	12	Wingpass' Macro Assembler	41
Competition Corner	17	Ancestry – Genealogical D'base	43
Matters Arising	20	Graphics Utilities	44
Help Needed and Offered	22	Digi-Sim Logic Simulator	48
Contact Box	23	SYS and other FX (Effects)	51
DiscTree – Search & Save	24	Fact-File	57

Products Available Now

• **BASIC V manual** – For those of you who have ordered the new A400/1 series machines, you will find that you have a language called BASIC in your computer but that you have no documentation for it! Acorn have now produced a separate BASIC V manual which you can buy for £19.95 (or £19 from Archive including p & p). This is in stock at the Acorn warehouse even though, at the time of writing, the 400/1 computers are not available.

• **DIGIT Image Analysis Software** (manual, 3.5" disc and connecting lead) £150 from the Institute of Ophthalmology. DIGIT is used for the accurate measurement of objects traced on a high resolution Summagraphics Bit Pad 2 digitiser tablet (£405 + VAT). Video screens captured with the Watford Video Digitiser may also be measured with a screen cursor controlled by the Archimedes mouse or the tablet. DIGIT is simple to use and performs all the functions of expensive image analysis systems costing many thousands of pounds for a minimum system cost of about £1,500.

• **DiscTree** – Search and save utility for RISC-OS from Mitre Software (£49.95 or £44 through Archive) allows hard disc users to archive and restore files and provides search facilities to find those lost files that you put on the hard disc somewhere! There is a review on page 24. (Desktop Enhancer users can get a 20% discount on DiscTree when purchased direct from Mitre Software by simply returning their DTE master disc with a cheque for £39.95. Send it direct to Mitre, NOT to Archive.)

• **Noah Paint Professional** – 256 colour art package from GMA in Hamburg. Instructions are written in English! We have one available for review, so if the reviewer thinks it is good, we could stock it and offer it at a discount. From GMA, it costs £129 +VAT.

• **Paul Hobbs' shareware disk** which we mentioned in Archive has now been updated to include RISC-OS versions of the Video Tape Indexer and Cassette Inlay Printer and he now has a second disk which will have the ARCSAN modifications and indexes for Archive plus a RISC-

OS version of the 'PhoneBook' program from an early Archive Shareware disk. This is available for £1.50 plus a blank formatted disk as was the first disk. The first disk incidentally also contains extensive BASIC library files including one for the WIMP manager as requested by somebody in Archive 2.6. The applications, even if they are not of any interest in themselves, are based around a common skeleton program and between them they demonstrate how existing programs can be adapted to run under the WIMP manager.

• **R140's at Archive prices?** If anyone is interested in buying one or more of the new Acorn Unix machines (list price £2949 plus VAT) at Archive discount prices let us know (by letter, phone or via Eureka II) and we will see what we can arrange.

• **Shareware Summary** – Here is a list of all the different Shareware discs that are now available. **Shareware N°0** – Originally called the "Graphics Demo Disc" – 49 graphics demo programs plus "MenuMaster" – a program which allows you to add in your own demos and edit the order in which the programs are run.

Shareware N°1 – MenuMaster with 7 more graphics demo programs plus Life, Mandelbrots, European Geography, Structured Directory Lister.

Shareware N°2 – DFS reader, backup and archiver, 9 graphics demos, 256 colour Sprite Editor, CMOS ram Editor, Disc Copier, LQ printer Font Definer, Matrix Functions, Memory Mappings & Vector Listings, BASIC Fast Screenload, Connect Four, Mastermind, Solitaire and Star Trek. (Cost £4.50)

Shareware N°3 – Epson printer setup, Underground map update, CMOS editor update, System Delta to FWPlus mailshot, Audio tape inlay printer / database, Videotape database, File transfer with a Liberator, Monitor test pattern generator, Contours Demo, Graphics Demo, VTR count-down clock, "ARC" file compressor / decompressor, Flip Game, Night Shooter, Let Drop.

Shareware N°4 – BBC font character editor, Bird watcher's database, 3D Mandelbrots (BASIC), Graphical shape transformations, 8 "pretty

patterns" programs, Hidden line graph plotting, FWPlus printer driver editor, File transfer and sorting utility, Patience, Golf.

Shareware N°5 – 51 pieces of music, some classical, some modern, for the Music Editor.

Shareware N°6 – Full of utilities etc for First Word Plus – some new items but mainly a compilation of all the items previously available through the monthly program discs.

Shareware N°7 – A disc database of Archive magazine plus data files for Archive, Risc User and Beebug for use with the ArcScan Database available from Beebug.

Shareware N°8 is a single game "YAIG" – Yet Another Invaders Game from Bjørn Fløtten in Norway. We decided it was good enough to stand as a single disc – in any case, it occupies over 600k of disc space. (Works only on 1 Mbyte+ machines.)

Shareware N°9 contains various graphics demos and examples of computer graphics, several file utilities (EXALL, disc tree printer, filetypes and 'filedo' utilities and a disc recoverer), mode 15 to mode 12 converter, palette converter (Arthur to RISC-OS), NEC printer utilities, two fast fade programs as requested in Archive 2.6 p 22, System Delta export utility, ADFS disassembler (Arthur only), bank account manager and three games: 3D breakout, bowls and roller ball.

Shareware N°10 contains Address book database (WIMP based), 4096 colour selector, expenses manager (WIMP based), Reversi game, Star Trek


game, a simple 3D volume of rotation program and 29 astronomical programs from Dr P. Duffett-Smith's book 'Astronomy with your personal computer', converted for Archimedes by Mr D. Fagandini.

Shareware N°11 contains 6 concerti in Maestro form, one each from Messers Beethoven, Chopin, Grieg, Liszt, Mozart and Schumann.

Disc copier – There was some confusion caused by an advert we put in some of the major magazines which referred to the disc copier on Shareware N°2 as a 'disc editor'. Sorry about that. If you want a disc sector editor, there is one on the program disc Volume 1 N° 6. The disc copier is for allowing you to do backups of discs that have some sectors damaged so it can be used for recovering duff discs as long as the duff sector is not part of a directory. It could also be used to make a backup copy of commercially protected discs to allow you to keep a backup copy in a safe place.

• **Vietnamese fonts** – Ian Copestake Software now has Vietnamese fonts for use with First Word Plus on the Archimedes.

Review Software Received...

Apart from reviews already written we have received review copies of the following software: Noah Paint Professional. (*In case you are wondering why so little of the software actually reviewed in Archive appears on this monthly list of what is available, that is because I advertise them on Eureka II and they usually get snapped up before the magazine goes into print.*) 

Forthcoming Products

• **A410/1, A420/1 and A440/1** – The new range of Archimedes has been announced (I use that word advisedly!) which has the re-styled case, the new p.c.b. and is said to run 10% faster. The 410/1 (£1199 +VAT) has 1 Mbyte upgradable to 4. It has the hard disc controller hardware but no hard disc and has a four-slot backplane as standard. The 420/1 (£1699 +VAT) has 2 Mbytes and an internal 20 Mbyte drive. (i.e. it is equivalent to the existing A440 less 2 Mbyte of RAM.). Finally, the A440/1 (£2499) has 4 Mbyte RAM and a 50 Mbyte internal drive. (These prices do not include a monitor.)

• **ARM3 chip for Archimedes / R140** – Here is an interesting press release which I reproduce in full...

New Acorn Processor to upgrade existing Arcs
With the announcement by VLSI Technology Inc of Acorn Computer's new ARM processor, colloquially known as 'ARM3', comes news of an upgrade kit for existing Archimedes 300- and 400-series and R140 computers.

Cambridge-based Aleph One Ltd says it will supply a small circuit board which replaces the ARM2 processor with an ARM3 and control circuitry for

"a few hundred pounds" available from "the middle of the year". This may be fitted in seconds using a simple tool provided as part of the kit.

The ARM3 processor is based on the same RISC microprocessor core as the current ARM2 but adds 4 Kbytes of very fast 'cache' RAM and bus synchronization circuitry. This allows the processor to spend much of its time running from its local cache memory but still allows external memory access at the usual speed when necessary. Standard upgrades are expected to run the processor core at 24 MHz, with 48 MHz available when supplies permit.

Tests prove that the ARM3 is fully ARM2 software compatible (both RISC OS and Unix run unmodified) and typically offers a factor of two to three speed improvement over ARM2, occasionally reaching a factor of five. In particular, the reduction in memory bandwidth used by the processor means that high resolution graphics modes which have slowed ARM2 systems, affect the processor considerably less. This makes ARM3 upgrades particularly useful in graphics-intensive applications, notably RISC OS and X Desktop.

~~~~~END~~~~~

I checked with Aleph One Ltd and they said that although they hadn't actually been able to get a chip to try out their new board, their claims were based on work done on evaluation samples within Acorn. The speed increase is particularly noticeable on graphics-intensive tasks since Acorn have written the RISC-OS graphics routines so that they can run within the 4k of cache ram on the chip itself.

The speed increases refer to the 24 MHz chips and clearly, the 48 MHz chips (when the silicon becomes available) will provide even more speed increase though not another factor of two since the whole process is limited by the speed of the main ram. Because the speed increase is very dependent on the type of application, they say they are prepared to run speed tests on any software that people want to send them, though obviously they cannot do so until they actually have the chips available from VTI to try it out on. If you are interested, contact Aleph One Ltd on 0223-811679.

• **Atelier** – A new art package (£99.95) from Minerva available week beginning 29th May.

• **Desktop Publishing** – There are two packages that we know of that are under development. Computer Concepts' 'Impression' is said to be "available some time in the summer" and Acorn's own DTP package should be "some time in June" and will cost "round about £150 +VAT".

• **GraphBox** – from Minerva Software is, to quote their press release, "an impressive multitasking data presentation package. There are twenty different types of graph to suit varying data and presentation requirements. Data entry is in spreadsheet form or may be dragged between other programs such as Arc Edit or Draw. It is fully multi-tasking. Many graphs may be plotted on one axis or in monochrome if desired.

Chart and graphs include: Scatter (with Error Bars), Line (with Error Bars), Bubble, Polar Scatter, Stacked Area, Cumulative Area, Bar, Wire Surface, 3D Bar, Stacked Bar, Percentage Bar, Horizontal Bar, Horizontal 3D Bar, Horizontal Stacked Bar, Horizontal Percentage Bar, Pie, Surface, Polar Line

The X, Y or Z axes may be linear, logarithmic, squared or a function of your choice. All mathematical functions are accepted as input including COS, SIN, RAD, ACS, LN, etc. Integrates with ALL suitable RISC-OS applications e.g. spreadsheets, databases, DTP, CAD, etc. or load data from CSV, TSV, ASCII and other files."

• **Ibix the Viking** – A new game (£19.95) from Minerva available week beginning 22nd May

• **Mach Technology** are advertising, in a double page colour spread in A & B Computing (i.e. over £1,000 worth of advertising!), four major new products: **Hyperbase** (£49.95) an advanced database which supports cards and stacks containing textual and graphical data in any combination; **Modula-2 compiler** (£89.95) – an optimising compiler based on Wirth's 4th edition definition; **Mach BASIC** (£39.95) – a BASIC compiler with "full BASIC V support" which "correctly handles dynamic scoping, local variables and arrays unlike the competitors". Their claim is that it is "the fastest compiler on the market"; **20Mbyte hard disc and podule** (£249) – no, that's not a typing error, the advert does say £249 and that is inclusive of VAT though carriage is extra. All the other prices are inc VAT and p&p.



It is strange that this is the first that we have heard of this company offering four such major products at such amazingly low prices. I have not yet managed to find anything out about the availability of the products as I only got the magazine yesterday and it is now bank holiday weekend, but I will try to find out and put it on the Order Form which goes to the printers a few days later than the magazine.

- **Timewatch from Mitre Software** is a time management tool costing £29.95 and which should be available "late May". It manages appointments,

includes a day-to-day notebook and allows the management of a 'To Do' list for tasks. For the forgetful, details of anniversaries, birthdays etc can also be entered. You can organise the timing and duration of appointments and it keeps track of 'ongoing' and 'overdue' tasks. It will do searches of the data and, of course, allow you to print out the data in various ways. It is RISC-OS only, but allows you to import data from Arthur diary files.

- **Programmers' Reference Manual (version 2)** – Available "some time in August", say Acorn. **A**

## Comments Various

### "Credit where it's due"?

The only comment I've had for this new section that I was hoping to run was about Minerva. Richard Collinson had an early version of Home Accounts that had one or two problems. He sent it back and Minerva who sent him the new version by return of post. What's more he notes that Home Accounts is not copy-protected! Have Minerva "seen the light" and adopted the much more sensible policy of trusting people to avoid annoying the serious users?

*Are Minerva the only people giving good service? Surely there must be others. Do tell us about them.*

### "Eureka Rules! OK?"

Eureka 1 has been off line for a while, due to a sequence of hard disc crashes. The board runs at the moment on a BBC Master 128 with a 20 Mbyte Amcom drive which, perhaps because of badly designed software, has never really been man enough for the job. The drive has been sent back to Amcom and we are awaiting their verdict on it.

Eureka 2 is going steadily, having just passed 3,500 calls. It has reached the stage where, certainly at low call charge times, it is virtually impossible to get onto the board without auto re-dial software.

I personally find the board an extremely useful way of contacting people. If I need someone to review some new piece of software I can generally find someone to do it by putting a note on the board. Also, I receive and answer between 4 and 10 letters a day via the board.

The last issue of Archive, in particular, contained quite a lot of technical information gleaned from

Eureka 2. The fact that there is not so much in this month's magazine does not reflect a reduction in the amount of information available via Eureka. In fact, I think it has increased. What it does reflect is the fact that I have had a lot less time available to collate and edit the information. (How about someone offering to do a Eureka Digest section in Archive?)

### High speed modems for sale!

I said I would see if I could arrange any discounts on 2400 baud modems to try to get other folk going on Eureka 2. I have so far found two suitable modems. The first one is the Miracle WS3000 (V22bis) which is the one I use. We have managed to get what seems to be a very good price – it retails at £425 +VAT = £488.75 and we can offer it at £395 inclusive of VAT and carriage.

The WS3000 is a bit of a Rolls Royce among 2400 baud modems, so we've also found a supplier for the Amstrad SM2400. The Amstrad retails at £249 +VAT = £286.35 and we can sell it for £265 inc VAT and carriage – not as good a percentage discount as the WS3000, I'm afraid, but if anyone knows a supplier we could try, let us know.

Both the modems have similar specifications, except that the WS3000 has a memory store for 60 numbers held in battery-backed ram. Also, it seems to be better made than the Amstrad, though that is a very subjective view. More objectively, it does not seem to have quite as high an operating temperature, as does the Amstrad. (N.B. These observations were made by comparing one WS3000 with one SM2400.) Is the WS3000 really



worth half as much again as the SM2400? Well, I'm afraid I really cannot say.

### Hardware and Software Available?

I have for a while been unhappy about mentioning various products in the "Hardware and Software Available" section of the magazine, knowing that they were not *actually* available now even though some were promised for some time in the near future. What I have done therefore is to have two different sections: "Products Available" and "Forthcoming Products", which should be self-explanatory.

### BASIC Compilers Available?

The saga of the two BASIC compilers rumbles on with claims and counter claims, but at the time of writing (29th April), Dabs Press say that their ABC version 2 is ready for release in terms of the programs and that all they are waiting for is the manuals that are being printed. They say they should be available by May 2nd. Silicon Vision Ltd released their RiscBASIC in mid April but had to recall it because of technical problems with the programs. These are apparently now fixed and the up-dated versions are being sent out at the moment, though we haven't had any ourselves yet.

Brian Cowan has the unenviable task of comparing the two compilers and advising all those of us who are waiting with bated breath, which is the better of the two. Hopefully, his report will appear in the June Archive, but I will put up a summary on Eureka II as soon as it is available.

**STOP PRESS** – I've just seen an advert in A & B Computing (June pp39/40) by Mach Technology claiming to have a BASIC compiler for sale at £39.95 which claims to be the fastest compiler on the market and says things like, "Compare this to a primitive register allocation method from one competitor and erroneous handling of the semantics from the other." (See also "Forthcoming Products" on page 4.)

### RISC-OS – A rose by any other name?

We have had discussions Philip Colmer from Acorn via Eureka II about RiscOs? or is it RISC-OS? Philip insists that it is RISC OS and not RISCOS. Sorry, let me say that again in a mono-spaced

typeface so that you can see the difference... "RISC OS and not RISCOS". Sorry, Philip, but as you can see, in proper typeset text the space doesn't show up too well, so I've decided to use RISC-OS. Hope you don't mind.

### RISC-OS Available?

I spoke to David Bell, Group Products Manager at Acorn who said that he stood by his original statement that we should have all the 1,300 RISC-OS we ordered by the middle or end of May. At the time of writing (29th April) we have so far received just over 250 sets. If David's prediction proves true, I will have enough to fulfil existing orders and spare to sell by the end of May. If you want to know the latest position, ring 0603-507057 out of office hours – there is a message on the ansaphone.

### "What do we do with the money?"

We've had quite a lot of suggestions about what we should do with any excess cash generated by the magazine. Thanks for all the different ideas.

### Help for disabled

Many of you have suggested doing something for disabled folk and in particular, something that involves using computers. This is a great idea and one which, I am sure, everyone would support. However, what I would like to do is more than just donate some money to a charity. The point is that amongst the thousands of Archive subscribers there must be some folk who have a bit of spare time and would be willing to do a bit of programming and/or provide some advice to the users.

What I am suggesting, therefore, is this. If anyone knows of an appropriate project that we could get involved in, then let us know. I will let everybody know, through the magazine, just what is needed and ask for specific offers of help and/or specific donations (which could be made payable direct to the charity in question, to avoid tax complications) and we would also make some sort of donation from Archive's profits.

### Give your software away

There may be some folk who would be prepared to donate software that they have decided they no longer need. There are two outlets for this. Firstly, there may be charities who use Archimedes and

would be able to use the software directly (the Norwich Toy Library which works with disabled kids is one possibility). Secondly, I've had an appeal from Oxfam to donate any "spare or unused stock of software, peripherals, consumable or even hardware" to their appeal. I haven't found out yet whether it has to be new stuff, but some of the stuff people are selling in the Small Ads section is said to be "in mint condition". Alternatively, we could advertise it through the Small Ads, giving the proceeds to charity.

### Careware Discs

Another idea is that we should sell a 'Careware' disc or discs. This is raised by Ray Loades-Bannon in the Readers' Comments section below.

### Eucorn – Charity Software

Another approach, which depends on individual initiative, is to write some software and offer it free of charge to folk who will send you, personally, a blank disc. The understanding is that you then make a donation to charity in recognition of the software's value to you.

Ronald Alpiar has done this with his Eucorn music package, advertised last month and again this month, and he has already had a good response. I had a slightly difficult decision to make as to whether to charge Ronald for the advert. Why difficult? Surely, after all I've said about giving money away to charity, I shouldn't even think of charging! Well, I did in the end decide not to charge, but in one sense it is you, the reader, who is paying for the advert in that you are losing half a page of technical information space that you paid for with your subscription. If anyone is unhappy about the decision, please let me know because if you don't speak up, I may be upsetting people without knowing it.

• **Attention All Shareware Contributors!!** – I have the enjoyable job of compiling Archive's infamous Shareware Discs. A job which I have recently found increasingly difficult not due to a lack of a incoming material but in fact just the opposite. I have been inundated with discs containing all manner of wonderful offerings. To aid the processing of all this data, especially to make it RISC-OS compatible, I would request that future contributions follow the following guidelines.

- Your offerings should be stored in a sub-directory called '<your name>' e.g. \$.FredBloggs.
- Try to include documentation or some brief notes on the disc as a text file. First Word Plus files should be saved with the WP Mode off.
- The documentation should be called "<?<program name>"
- The program should be run by a file called "<!<program name>"
- Make sure you credit yourself and others who have helped on the title screen of your program.
- Do not send us other people's work claiming it as your own just because you have modified it! This can cause real trouble with copyright. All software is accepted in good faith.
- Avoid large Sprites/Screen/Data files because they take up precious disc space.
- Include some notes on configuration.
- If you want your disc back, **please put your name and address on it.**

Thank You for your co-operation and continued support. Please send your shareware contributions and comments to Matthew Treagus, Shareware Editor / Compiler, 30 Hampton Lane, Blackfield, Southampton, SO4 1ZA.

## Readers' Comments

• **Charity shareware disks – "Careware"?** My idea is that you would ask people to donate shareware which they would allow to be sold at a profit. The resulting 'CareWare' disks would then be marketed at a premium above the normal shareware disk price with all profits going to charity. I'm sure the premium could be justified on moral grounds alone but also perhaps software could be 'hand-picked' and perhaps documented a little more.

I am sure that people who are motivated to give software away to the public domain would be even more keen if it were to the benefit of charity. I certainly would be. Ray Loades-Bannon

That seems a great idea, Ray. The other suggestion I have had, leading on from this is that some indication should be given as to where the money was to be going, e.g. Careware (Childline) or



Careware (Famine Relief) or whatever. To avoid complication, I think we will have to be the sole arbiters of where the money should be sent.

If people would like to donate software specifically for Careware, please send it direct to Matthew Treagus (see above). But I think we will have to say that Matthew will select the very best software for the Careware disc(s) and put the rest on ordinary Shareware. That will actually put Matthew in a difficult position as sole arbiter of what is "the best", so I hope you will not be too cross with him if your program doesn't get selected! Ed.

- **Euclid revised (1.04) and Euclid Design (1.01)** – Euclid as first issued was reviewed in Archive 1.10 p 48. This brief review attempts to point up some of the changes. This is not the RISC-OS version of Euclid: that is on its way, at extra cost to existing users, to include a new manual. The version under review is RISC-OS compatible and is the definitive Arthur version.

Euclid Design is not easy to start to use but derives its power from the Euclid graphics "engine" module. Once you have started, the new version places the power much more conveniently at your disposal than the old. On-line help is always available and each window, including views not in any of the three planes, can be used either in edit mode, where you can change designs, or in view mode. In view mode, drags with the mouse change the viewpoint.

Other welcome changes are that rotation and scaling of objects can now be carried out with mouse drags which do not inadvertently do the other action and the provision of a facility to create irregular shapes freehand. Planes may now have transparent holes in them and lighting effects are well implemented. It is now much easier to move around the data structure without recourse to the keyboard. Formal moves can be made using the mouse buttons and it is possible to move informally simply by pointing at an object and clicking select.

There are a wealth of facilities in this package, so much so that it needs more attention than I have had time to give to find their full potential. If you have any interest in 3D graphics and design, most of the spiky bits of the older version have been smoothed

over and the new version is quite superb. Oh Dear, I've forgotten who that was written by. Sorry!

- **RISC-OS** – (this proves someone has got it!) – Since I received my RISC-OS a week ago, there has been little time for sleep as I wrestle with all the new features and incredible software that comes with it. It really has turned my Archimedes into the most powerful home/business computer I have ever seen. Let us hope that the software houses will take full advantage of RISC-OS to produce quality packages only dreamed about on other systems. Jon Young, Middlesex. **A**

## Small Ads

- **First Word Plus** only few weeks old £70. Wordwise Plus £18. Offers? Has anyone got any drams (4464-12 or 41464-12) going cheap to upgrade my Arcimedes' memory? Phone 0922-418923 (evenings).

- **A310 colour** with Atomwide 4-slot backplane, Acorn hard disc podule and Fujitsu 40 Mb. Perfect condition. £1550 o.n.o. Alan Barclay on 0224-642765, (evenings).

- **Pacmania**, Conqueror, Terramex, Alerion & Zarch – £10 each. Jet Fighter, Hoverbod, Missile Control – £6 each. All originals, v.good cond. Trevor on 0406-380621 (evenings).

- **Archimedes 310M** with RISC-OS, hard disc and 5.25" external drive, manuals/software costing £350, all for only £1500. Phone 061-445-1379.

- **Graphic Writer** £13.50, Artisan £17.50, Artisan Support £9. All as new. Phone Jon on 01-908-1185, (evenings).

- **Repton 3** – £12.50 – Phone Andy on 06285-27046.

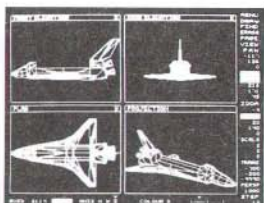
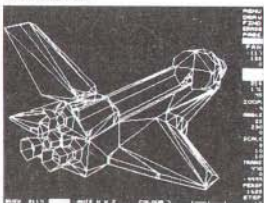
- **For Sale:** Keyboard spares: lead, circuit board, keytops, FNkey-strip holder, case. Sorry, no rubber feet!! Also, spare mouse and cheap GLP ribbons. Matthew Treagus, 30 Hampton Lane, Blackfield, Soton. SO4 1ZA. 0703 893596 after 5pm or weekends. **A**



# SILICON VISION

## SOFTWARE FOR THE ARCHIMEDES & BBC

### SolidCAD



The ultimate 3D Drafting System for Architectural design, Interior design, Engineering Design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D view. Includes powerful zoom & pan options for precision draughting and surface definition for creating solid colour objects. Also includes Sweep, Extrude & Macro facilities for designing very complex objects easily. Designs created with SolidCAD are compatible with the Realtime Graphics Language for high-speed flicker-free animation. The custom Archimedes version also performs smooth shading for realism. SolidCAD(Arc) users can upgrade to the Realtime Solids Modeller (Arc) for £40.00.

**£49.95 (ARC & BBC) New**

### REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM Risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and high-speed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

**£89.95 (ARC) New**

### REALTIME GRAPHICS LANGUAGE

The Realtime Graphics Language now provides a complete 3D Solids Wireframe animation system with 52 star commands and 3D Editors for designing objects to animate from your own programs. Includes a 35,000 pixels/sec line generator for fast 3D drawing rates. 3D Rotate, Scale, Orbit, Perspective and Turtlegraphics. Also compatible with designs created with SolidCAD (BBC).

**£49.95 (BBC)**

### SUPER-DUMP

The ultimate printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide 1920 x 1024 resolution. Images can also be scaled, positioned and previewed before printing. Fully compatible with SolidCAD, Realtime Graphics Language, Gate-Array design system & 3D CAD/Animation system. Your own graphics programs or other CAD packages can be made compatible with Super-Dump by the addition of a few simple commands. An example program is included in the package.

**£15.95 (BBC), £24.95 (ARC) New**

### Presentation Manager

The package provides an interactive environment to create, edit and play-back computer controlled presentations, films, films and demonstrations. Also handles graph plotting for user-defined and user-defined functions which can be incorporated within the presentation.

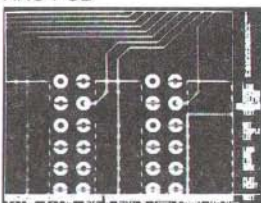
**£34.95 (BBC), £49.95 (ARC) New**

**SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW  
MIDDLESEX HA1 2AG. TEL: 01-422 2274 or 01-861 2173  
FAX: 01-422 5169. TELEX: 918266 SIGNAL G.**

**☐ (Access/Mastercard/Eurocard accepted)**

**All prices include VAT and Carriage (Overseas orders add £4).**

### ARC-PCB



The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001 resolution, 32 x 32 maximum board size, On-line Help, Fast Zoom, Pan/Redraw, Text & Silkscreen facility, Variable Line Pad Text Grid sizes, Part Libraries, Block Move/Copy/Rotate, Mirror/Erase options, and up to 300,000 components. For hardcopy, the system supports a large number of plotters and ordinary Epson compatible printers at very high resolutions (1920 x 1024) of 240 dpi for near laser quality output. An entry-level ARC-PCB system (without auto-routing) is available for £99.95 (Auto-routing upgrade: £100). Enquire about our turnkey PCB design systems complete with Colour Archimedes and/or plotters with prices from £1220 to £3909 (inc. VAT).

**£195.00 (ARC) New**

### RiscBASIC

Supercharge your Archimedes Basic programs by compiling them automatically into pure ARM Risc code with the RiscBASIC compiler. Features include Relocatable modules, Cross reference of all variables, functions, and procedures, Floating point and Integer support, Stand alone code generator, Optimising compiler & Full runtime error handler.

**£99.95 (ARC) New**

### RiscFORTH

A new 32 bit implementation of the FORTH 83 standard, designed to take full advantage of the ARM architecture. Features include Multi-tasking, Optimising compiler, built in ARM assembler with floating point mnemonics, built in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Gail finding and a standalone code generator.

**£99.95 (ARC) New**

# Hints & Tips

• **Floppy programs on hard discs** – Here's the best method I've come across of getting floppy programs to run on a HD machine. You need two FFF type files (or Obey if you want) One called 'Floppy' should contain:

```
*CON. Drive 0
*CON. NoBoot
```

The other called Hard should be:

```
*CON. Drive 4
*CON. Boot
```

If you put these in the library you can then

```
*Floppy
<ctrl-break>
<shift-break>
do whatever else
<ctrl-break>
*DIR :4
*hard
<ctrl-break>
```

(This assumes you have a !Boot on your hard disc.)  
Martyn Lovell

• **Head alignment problems?** – If you are getting disc errors and suspect that the problem might be head alignment, one way of confirming this is to use the disc copier program that you will find on Shareware N°2. The program does a check of the whole disc to find bad sectors. If one of the heads is misaligned, you will probably find that all the bad sectors reported are on one or other of the heads. Then it's time to take it off to your local dealer for repair.

• **Hearsay** – If you need to change modem baud rates with ATB3 or ATB0 after calling one remote system and before calling another, you can do so by using a dial prefix in the modem driver edit screen by putting "ATB3D" or "ATB0D" as appropriate.

• **Matrix Procedures and Functions** – This was prompted by Steve Drain's article in Archive 2.1 p.17 where he stated that a numerical method for the inverse of a square matrix needs a good guess of the inverse and uses the transposed matrix as a starting point. His excellent program has been timed to invert a 20 x 20 matrix to 1 part in 10<sup>9</sup> in approximately 10 seconds.

A good guess or even a desirable result can be obtained by a procedure described below. It calculates an inverse of 20x20 matrix in about 280 centiseconds giving an error in the non-diagonal elements of the identity matrix of less than 1 part in 10<sup>6</sup>.

The method used is based on the following. The matrix M to be inverted is premultiplied by its transposed M', giving M'M. The result is decomposed in a lower triangular matrix L satisfying the identity LL'=M'M. Then I, which is the inverse of L, can be determined in a straight forward way. Matrix I'I thus equals the inverse of M'M, and finally I'IM' gives the result wanted. This is correct as can be seen when premultiplying a vector x by M giving a vector v, and solving for x.

$$Mx=v \implies M'Mx=M'v \implies LL'x=M'v \implies I'ILL'x=I'IM'v \implies x=I'IM'v$$

In fact, this is the least square solution for vector x, i.e. r equations with c unknown variables (r>=c) are solved using the criterium that the sum of the squares of the deviations to a solution of vector x obtains a minimal value.

The program presented below uses PROC lst\_sq\_inv to determine the 'inverse' Mi of any matrix M. If M is a square matrix then MiM=E and also MMi=E, E being the identity matrix. As an 'extra', the determinant of the square matrix M can easily be calculated. To my knowledge the method is numerically very stable.

```
10 REM >Matrix_Inv
20 :
30 *****
40 REM Inverting an arbitrary matrix
50 REM E.D. Engelhardt, March 1989
60 *****
70 :
80 REM *** Generate random matrix M,
      col% columns and row% rows
90 CLS
100 PRINT"" Inverting an arbitrary
      matrix""
110 REPEAT:INPUT" Rows          :
      "row%:UNTIL row%>0
120 REPEAT:INPUT" Columns <= rows :
      "col%:UNTIL col%<=row% AND col%>0
```



```

130 CLS:PRINT'" Rows      : "STR$row%
      " Columns : "STR$col%
140 row%-=1:col%-=1
150 DIM M(row%,col%)
160 FOR r%=0TOrow%:FOR c%=0TOcol%:
      M(r%,c%)=RND(1)*SGN(0.5-RND(1))
      :NEXT:NEXT
170 :
180 start%=TIME
190 :
200 REM Determine the 'least square'
      inverse Mi of M. Result : Mi.M is
      equal to the identity matrix E.
      If rows = cols also M.Mi = E.
210 :
220 DIM Mi(col%,row%):PROCLst_sq_inv
      (M(),Mi())
230 end%=TIME
240 :
250 PRINT'" Time(centisecs) : ";
      STR$(end%-start%)'"
260 :
270 PROCprint
280 END
290 -----
300 DEFPROCLst_sq_inv(R(),Ri())
310 REM Ri is 'least square' inverse
      of R, i.e. Ri.R = E (identity
      matrix). If rows = cols also
      R.Ri = E.
320 REM Dimensions R(v%,h%), Ri(h%,v%)
      ==> v% : rows , h% : columns
330 REM E.D. Engelhardt, March 1989
340 :
350 LOCAL RtR(),L(),I(),v%,h%,c%,r%,t%
360 v%=DIM(R(),1):h%=DIM(R(),2)
370 DIM RtR(h%,h%),L(h%,h%),I(h%,h%)
380 :
390 REM Determine transpose of R
400 FOR r%=0 TO v%:FOR c%=0 TO h%:
      Ri(c%,r%)=R(r%,c%):NEXT:NEXT
410 :
420 REM Calculate square matrix to be
      inverted
430 RtR()=Ri().R()
440 :
450 REM Calc lower triangle L of RtR
460 FOR c%=0 TO h%:FOR r%=c% TO h%
470   L(r%,c%)=RtR(r%,c%):t%=c%-1
480   IF t%>=0 FOR t%=t%TO0STEP-1:
      L(r%,c%)=L(r%,c%)-L(r%,t%)*
      L(c%,t%):NEXT
490   IF r%>c% THEN L(r%,c%)=L(r%,c%)
      /L(c%,c%) ELSE L(r%,c%)=SQR L(r%,c%)
500 NEXT:NEXT
510 :
520 REM If R is square (rows = cols)
      its determinant equals the product
      of the diagonal elements of L. The
      determinant of RtR equals the
      square of the determinant of L.
530 :
540 REM Invert triang matrix L to I
550 FOR c%=0 TO h%:FOR r%=c% TO h%
560   FOR t%=c% TO r%-1:I(r%,c%)=
      I(r%,c%)-L(r%,t%)*I(t%,c%):NEXT
570   IF r%>c% THEN I(r%,c%)=I(r%,c%)
      /L(r%,r%) ELSE I(r%,c%)=1/L(r%,r%)
580 NEXT:NEXT
590 :
600 REM Determine transpose L of
      inverse triangle I
610 FOR r%=0 TO h%:FOR c%=0 TO
      h%:L(c%,r%)=I(r%,c%):NEXT:NEXT
620 :
630 REM Inverse matrix of R is Ri
640 RtR()=L().I():Ri()=RtR().Ri()
650 :
660 ENDPROC
670 -----
680 DEFPROCprint
690 VDU 14
700 PRINT" ***** Elements Matrix'"
710 FOR r%=0 TO row%:FOR c%=0 TO
      col%:PRINT M(r%,c%):NEXT:PRINT:NEXT
720 PRINT" ***** Elements inverse
      Matrix'"
730 FOR r%=0 TO col%:FOR c%=0 TO row%
      :PRINT Mi(r%,c%):NEXT:PRINT:NEXT
740 DIM E(col%,col%)
750 E()=Mi().M()
760 PRINT" ***** Elements of
      Inverse Matrix.Matrix'"
770 FOR r%=0 TO col%:FOR c%=0 TO col%
      :PRINT E(r%,c%):NEXT:PRINT :NEXT
780 VDU 15
790 ENDPROC

```

• **Repton 3** – There is a bug in screen E of WORK, so to get past it, you will need to know the next password which is COUNTER.

• **Three floppies under Arthur** – Here is a solution to the problem of three floppies on the desktop (Archive 2.7.12). Enter the following in a file called 'Desktop' in the library directory, use \*BUILD or a text editor such as Twin to enter it.



```
*BASIC
LOAD "DESKFS:DeskTopMgr2"
11 OSCLI "DESKFS"
12291 IFfloppies%>2 THEN PROCsys
    addtoiconbar_left("floppy2",
        "disc3.5",&301A,icon_fgcol,
        icon_bgcol, icon_width%)
28600 DEFFNselect_floppy2
28610 =0
28620 DEFFNmenu_floppy2
28630 PROCsys_definetextmenu
    ("floppy2","floppy :2","Format")
28640 =0
28650 DEFFNaction_floppy2
28660 =FNfilehandler_open_dir
    ("--adfs--:2","Floppy :2",0)
28670 DEFFNmenuselect_floppy2
28680 CASEitem0% OF
28690 WHEN0: PROCfilehandler_
    formatfloppy("2")
28700 ENDCASE
28710 =0
RUN
```

When you wish to use the three floppy version of the desktop, instead of typing \*DeskTop, enter \*/DeskTop, this will ensure that the upgrade program in the library directory is run instead of activating the desktop in the normal way.

Unfortunately, there is no way of permanently updating the desktop so that you can power up into the desktop with three floppies since it is held in ROM which obviously cannot be changed.

If you wish to power up in the desktop with three floppies then you could do the following:

```
*Configure Boot
*Configure Language 0
and setup a !Boot file as follows:
*/Desktop
```

ensure that when you switch the computer on, your boot disc is in drive 0 (or your default drive as configured with \*Configure Drive) and the desk top will appear after a short delay.

N.B. No damage will be caused to the disc in powering up with the disc in the drive since the latch will be across the disc surface and the disc heads not in contact with the disc surface.

The other solution is to upgrade to RISC-OS which can support up to four floppies! Darren Jackson

- **Zarch** – To put Zarch onto a hard disk, use....  
\*UNPLUG SoundChannels  
\*ZARCH

When error occurs type the following,

```
*RMREINIT SoundChannels
*SAVE :4.ZARCHcopy 8000+20800
*BUILD :4.ZARCHgo
LOAD ZARCHcopy
MEMORYA E1AC E1A0F00E
CHANNELVOICE 1 6
CHANNELVOICE 2 7
CHANNELVOICE 3 8
CHANNELVOICE 4 9
GO 1FF30
```

Then press <escape>. Type ZARCHgo to run the copy from hard disk. Tony Porter **A**

## RISC-OS Hints and Tips

- **RS423 fix?** – You do not need to load Fix124. In fact it will now mess things up if it is loaded. Beware \*EXEC files and the like which contain it!

- **ALT key problems?** – Programs using the ALT key (e.g. Arcterm and PipeDream) work a lot better with \*UNPLUG InternationalKeyboard. If you want to have this in a file without an error, do \*RMREINIT followed by the \*UNPLUG command.

- **Palette File Format** – The palette file format for the RISC-OS desktop is different to that for Arthur 1.2 desktop. The difference is that the new format contains the VDU commands as well as the colour values. This adds another three bytes in front of

each set of three colour values. The advantage of the new format is that it can be \*PRINTed to give immediate effect to its contents whereas the old format had to be processed by a program so as to add the appropriate VDU commands. Beware, however, that First Word Plus uses the old format. (There is a palette convertor program on Shareware disc N°9. Ed.)

- **\*WimpPalette Command** – This new command (see new User Guide page 415) can be used to preset the palette file name used by the desktop when it starts up. The command should be placed in a !boot file before calling desktop.

• **\*Desktop Command** – This command (see new User Guide page 391) can include an initialisation file as stated. In addition to the commands suggested this file can contain commands to the filer which are not documented in the User Guide.

The most useful of these is `*Filer_OpenDir [directory]`. This causes the desktop filer to start up with the specified directory filer window already displayed on the screen. For further information on these commands type `*HELP FILER.` at the supervisor prompt.

• **File Types** – The new User Guide Appendix D omits to mention Logistix data files which have type DFF. The type AF8 for First Word Plus files is not used by the current version of First Word Plus.

• **\*Compact** – Although the new User Guide page 249 states that discs formatted in E format do not require the use of this command, it would appear that the command has a significant effect when used on a hard disc which has had a number of files deleted or moved. Perhaps it reduces the degree of fragmentation?

• **Help!** – Does anybody know how to leave the desktop completely by using a command in a command file? The normal process is to start up a new supervisor shell which returns to the desktop on completion of the command file. Attempts to use `*QUIT` or to simulate the pressing of `<ctrl-shift-f12>` have so far failed. This facility is desirable particularly when setting up an environment for program development. David Scott

• **Escape problems?** – When working via desktop, specifically while editing and trying out a program, the escape key (and break) does not generate the escape condition. This can be overcome by using `*FX229,0`. Is there any other way of doing this? Tom Johnson, Plymouth

• **Task initiation** – If you want to start a 'TASK' from an already running application, then you cannot simply use a `*` command on the application directory – well, you can but you will find that your application will then close itself down. This is because the Wimp Manager wants to create a new 'domain' for any new tasks. To get round this there is a special operating system command; simply use:

```
SYS "Wimp_StartTask",block%
```

where `block%` is a pointer to the `*` command.

Alternatively you can use:

```
*WimpTask <* command>
```

which may seem a bit more familiar.

• **Obey files** – For those of you who haven't yet got around to writing your own DTP package, it is possible to experiment with the New Task option from the Task Manager menu. It is here that I come on to something of more relevance, which is the use of 'Run' in starting applications and this concerns the writing of Obey files.

Firstly, go into the desktop and allocate yourself some RamDrive, this will serve just as another filing system to enable me to demonstrate my point. Ensure that the current filing system is ADFS, to check this enter:

```
<f12>adfs <return> <return>
```

Select a disc with an appropriate application, I suggest the Editor, i.e. !Edit. Click on the floppy icon so as to open the filer window. Click MENU on the Task Manager's big A icon and move over to the New task option. Enter into the writable icon:

```
adfs::<disc-name>.$.!Edit
```

Substitute the appropriate disc-name from the window title, then change the current filing system to the RamDrive,

```
<f12>ram <return> <return>
```

Click MENU on the editor icon on the icon bar and create a task window. An error message will occur, because it has wanted to load a module from the disc, but can no longer find it. How is this?

There are some important lessons here regarding the way RISC-OS and the desktop finds files. All files, and by this I mean all files absolutely everywhere, including the ones on discs not in the drive, have a unique filename, as long as the disc has a unique disc-name. Discs now have names, rather than drives having numbers.

The full path-name of a file looks like this:

```
<fs>::<disc-name>.$.<dir>.  
<dir>...<leaf-name>
```

where `<fs>` is the filing system, `<disc-name>` is the name of the disc, `<dir>` is a directory name, `<leaf-name>` is the final file name.

So when the desktop requires a file which it 'knows' about, it knows exactly where to get it, even if it's



not in the drive, so it can request that you change discs, quite by itself. When an application directory is 'Run' then the full path-name of that application is read into a system variable called <Obey\$Dir>. This can be used in the !Run Obey file to \*Set system variables used by the application, so that it knows where to get its resource files. Because they are specified by a full path-name, there is no longer any real concept of a current filing system or a current directory and you should not rely on either being set and avoid thinking in this way! So where did the Editor go wrong? Well if you now type:

```
<f12>show <return>
```

then you get a list of all the currently set system variables and you will note that <Obey\$Dir> says  
:<disc-name>.\$.!Edit

What ever happened to the filing system? Since this was not specified in the system variable, it had to assume the current filing system, which we changed to the RamDrive. So, naturally, it couldn't find what it wanted. The reason why the filing system wasn't

there is because the application was started as a straight \* command rather than using \*Run. In this case, to quote Acorn, "the file can start with a <fs>: which (when it starts as a command) is treated as a 'temporary current fs' rather than part of the filename." So the moral of the story is, if you want to start up an application use:

```
*Run <fs>::<disc-name>.$.<dir>.<leaf-name>
```

Use this in Obey files or, from within a desktop application, use:

```
*WimpTask Run <fs>::<disc-name>.$.<dir>.<leaf-name>
```

To try this, 'Quit' the Editor and use the New task icon again, this time typing:

```
Run adfs::<disc-name>.$.!Edit  
<return>
```

check <Obey\$Dir> with: <f12>show <return>  
This should now have the fs included and so !Edit can find all its resources. Gary Atkinson **A**

## Free Music Software!!!



### EUCORN!



- Eucorn is a revolutionary new generation of musical instrument
- You can perform prescribed pieces of music like a musician
- Real-time control of musical interpretation during performance
- Review in next month's Archive magazine (hopefully!)
- Runs on Archimedes 310, with amplifier & speakers (printer desirable)
- Disk contains performance program (both BASIC and ABC compiled versions) a music input program, a repertoire of classical pieces (over 2 hours playing time) and detailed 70+ page User Guide as a print file
- Customers welcome to contact the author at any (reasonable) time
- There is NO CHARGE for Eucorn: after receipt and testing, it is hoped that the customers will donate a suitable sum directly to any recognised charity.
- To obtain the package, please send a first class postage stamp, self-addressed envelope and an 800k **formatted** 3.5" disc to the address below. Software copied onto your disc and posted back to you same day.

**Stellar Enterprise (Ronald Alpiar), 84 Dudsbury Road,  
Ferndown, Wimborne, Dorset, BH22 8RG.  
(Telephone Bournemouth 0202-575234)**



# BBC Acorn User Show

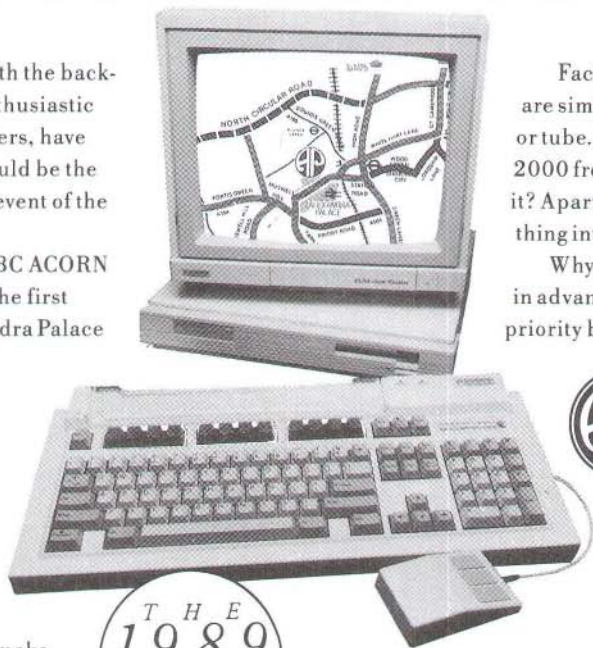
**B**BC ACORN USER, with the backing of the BBC and the enthusiastic support of Acorn Computers, have together planned what could be the most exciting computing event of the year.

The new, all-action BBC ACORN USER SHOW is back, at the first home of BBC TV – Alexandra Palace featuring:-

- new product launches
- new software
- massive computing exhibition
- informative seminars
- technical clinics
- workshops
- demonstrations

All this and more will make the new BBC ACORN USER SHOW a real must for everyone interested in computers and their applications.

There are daily competitions, free draws with fabulous prizes to be won and celebrity guest appearances.



THE  
**1989**  
BBC ACORN  
USER  
show

Facilities at the tastefully restored Alexandra Palace are simply superb and it's so easy to get to by road, rail or tube. If you're driving you'll be glad to know there are 2000 free car parking spaces. So why not make a day of it? Apart from the beautiful grounds you'll find something interesting and exciting around every corner.

Why not save time and money by booking your ticket in advance? Cut the coupon now and ensure your priority booking.



**ALEXANDRA PALACE · LONDON**

Friday July 21st 3pm-9pm

Saturday July 22nd 10am-6pm

Sunday July 23rd 10am-6pm

## BOOK NOW AND SAVE

Advance Tickets: Adults £2.50 Under 16s £1.50

At the door: Adults £3.50 Under 16s £2.50

Please send me \_\_\_\_\_ Adult Tickets at £2.50 each

Please send me \_\_\_\_\_ Under 16s Tickets at £1.50 each.

I enclose cheque/PO for £ \_\_\_\_\_ payable to SAFESELL Ltd., Market House, Cross Road, Tadworth, Surrey KT20 5SR.  
**DON'T SEND CASH.**

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## ANNOUNCING A MAJOR NEW SOFTWARE RELEASE

# Premier

Circle Software are proud to announce a major new software release for the Archimedes. Premier is so new, there is as yet no defined category for it. Is it a word processor? Is it a report generator? Is it a spreadsheet or a data base? Premier fits none of these categories, rather it spans them all. Premier is a major advance in capability from a single program. These are just some of its features -

The ability to read and execute commands from files allows any text processing to be carried out just by typing a 'star' command, or picking from the desk-top. Further, the ability to define 'macro' commands, and to assign these to ANY key, allows complete 'applications' to be built, including customised spreadsheets, and simple data bases. A command file defining a full featured word processor, with matching key-strip, is included with Premier.

This word processor alone justifies the purchase of Premier. It allows text to be moved between any number of files open at once, searches to be made forwards or backwards using powerful pattern matching, document headers and footers to be defined, has on screen formatting and other features too numerous to list here. The command file defining this may be edited to tailor the features to your own requirements, a feature not found in any other word processor.

DYNAMIC TEXT is a new concept which allows the inclusion of variable items within any document. Such items may show today's date or time, the current value of VAT, or a name and address. The actual text displayed may be computed, defined at the keyboard, or read from a data file. This system facilitates the production of statements and invoices, financial reports, or personalised mail shots.

Premier's powerful command language, which includes maths and string functions, repeat loops and 'if - then' constructs, may be included in the definition of a DYNAMIC TEXT item, allowing full spread-sheet type facilities anywhere on the page, not just in neat rows and columns. This also allows printer codes to be sent, providing the simplest method yet devised to control printer functions from embedded commands.

Now fully RISC-OS Multi-tasking.

Write or phone NOW for full details, of Premier, a £5 refundable demo disc or the full version of Premier.



Price including 160 page manual and applications, £96 + VAT, post free.

## Circle Software

33, Restrop View,  
Purton, Swindon,  
Wilts. SN5 9DG  
Tel: 0793 770021





# Competition Corner

## Steve Picton & David Bilsby

We have the result of Steve Picton's January competition and two new competitions. A mathematical one from Steve and an artistic one from David Bilsby. The prizes have been donated by Dabs Press and Clares Micros. (*Would any other software houses like to donate some prizes for future competitions? Anyone got any ideas for competitions? Ed.*)

### January's Competition Results

January's competition involved the computation of the prime number  $(2^{216091}) - 1$

The problem was to find the total number of digits in the result, the first ten digits, the last ten digits, and the sum of all the digits.

### The answers

The respective answers, which had to be given in decimal were:

- 1) 65050 digits, i.e.  $\text{INT}(\text{LOG}_2 2^{216091}) + 1$
- 2) 7460931030
- 3) 3815528477
- 4) 291745

### The winner

Almost all the entries were correct. In fact, a few lines of BASIC can be used to solve the problem, and so the tie-breaker was to avoid tying up the machine for too long. The fastest entry was from **Tony Guilfoyle of Wingpass Computers** and the promised 2-slot backplane and fan is on its way. Tony's program was written in C and took just 3 minutes 15 seconds to provide the solutions. Runner up was Hans Kommeren with a time of 4 minutes 46 seconds (Assembly language).

### How was it done?

A number of folk were interested to know how the fastest program achieved its results and I am sure that upon receipt of an SAE and blank formatted disc, Tony will be only too happy to supply a copy of his program.

### The May Competition

This month's competition is perhaps rather easier. There is no special emphasis on "the fastest entry

wins", so machine code black belts will probably not have any particular advantage.

### The problem

Anyone who has ever been involved with computations using days and dates may have encountered the following formulae. Each produces the "factor" associated with any chosen day in any year after 1582.

For January and February

$$\text{FACTOR} = 365 * Y\% + D\% + 31 * (M\% - 1) + \text{INT}((Y\% - 1)/4) - \text{INT}(3/4 * \text{INT}((Y\% - 1)/100) + 1)$$

For March to December

$$\text{FACTOR} = 365 * Y\% + D\% + 31 * (M\% - 1) - \text{INT}(0.4 * M\% + 2.3) + \text{INT}(Y\%/4) - \text{INT}(3/4 * (\text{INT}(Y\%/100) + 1))$$

For example, the factor for 30th April 1989 is 726587, and is obtained by setting  $D\%=30$ ,  $M\%=4$  and  $Y\%=1989$  in the second of the two expressions.

Given any two dates, the number of days between them can be calculated by computing the two factors and then simply subtracting them.

A day's factor can also be used to indicate the precise day of the week. Just take the remainder when the factor is divided by 7 (i.e.  $\text{FACTOR MOD } 7$ ) and use the result as follows;

- 0=Saturday
- 1=Sunday
- .....
- 6=Friday

One possible application for all this is an accounts package, which could easily work out the exact number of days that invoices were overdue.

This month, you have to produce a program to reverse the process. In other words, given any valid factor, the program must provide the day, month and year which corresponds to it.

The program must be in the form of a BASIC function, with a single numeric parameter (the factor). The answer must be a 10 character string in the form: DD/MM/YYYY

For instance, if the factor was 725193, then

PRINT FNdecipher(725193)

must produce: 05/07/1985 because 5th July 1985 is the date whose factor is 725193.

Apart from giving the right answers, there is no single feature which will characterize the winning entry. Clarity, choice of algorithm and programming style will all be taken into account. A further condition is that only one statement per line is permitted, although a REM is permissible as a second statement. This should not be a hindrance with BASIC V's block IF structure.

### Entries

Entries can be sent direct to Steve Picton at I.F.E.L. or to the Archive and must be in by **16th June**.

### The prize

I asked Dave Atherton of Dabs Press if they might donate an ABC Compiler package (version 2) as a prize for the best entry. They insisted that they would rather give a more substantial prize – "one of everything", Bruce Smith said. In other words, one of each of the Archimedes books, games, utilities etc that they produce! Thanks, guys! What I will do is to divide them up into two sets so as to provide a runner-up prize as well as a first prize.

## Render Bender Competition

David Bilsby has suggested a competition for Render Bender users to create the best ray-traced animation. This will be judged by the Archive staff – Sue, Ali and Paul (Bryan will be off doing some consultancy work in Turkey at the time) so that David himself will be free to take part in the competition. The aim is to make the most striking animation possible within the following constraints:

- 1) There is no limit to the number of screens but it must work on a 310 machine.
- 2) It can be low or high resolution but must be no smaller than 1/4 size screens.
- 3) Shadowing is optional.
- 3) It must be all your own work – no part of any of Clares Micros' own example scenes should be copied into your own.
- 4) Send the animation and the script file used to produce it on a 800k disc.
- 5) Entries must be received in the Archive office by **16th June 1989**.

### The prize

Dave Clare of Clares Micros has very kindly offered a copy of "Amadeus", their forth-coming music package, worth £79.95, due to be released in June, as a prize. Thanks, Dave! **A**

## INTRODUCING THE FIRST MULTI-LAYER 4-SLOT BACKPLANE FOR ARCHIMEDES

The 4-slot backplanes currently available for the Archimedes are all intended to do an identical job. They may even look very similar, *but the fact is they are not the same*.

Whereas cheaper backplanes use a simple double-sided circuit board, ours is a true multi-layer design. This is particularly effective in reducing electrical noise. Indeed, our backplane has already been shown to work in situations where a double-sided version did not.

### Features;

- ★ **Multi-layer design**
- ★ **Accepts up to 4 podules**
- ★ **Co-processor option**
- ★ **12 month warranty**
- ★ **Easy to install**
- ★ **High quality fan / filter unit**

Having compared several 4-slot backplanes from different sources, Computer Concepts have given approval to ours because of its superior performance.

The A440 is fitted with a multi-layer backplane. Since multi-layer boards are more expensive to manufacture, it is reasonable to assume that it has been considered necessary for technical reasons.

**28 day no-quibble money-back guarantee.**

### Prices (including VAT)

|                      |         |
|----------------------|---------|
| 4-slot backplane     | £59.95  |
| Co-processor version | £62.95  |
| 2-slot backplane     | £19.95  |
| Fan/filter for above | £10.00  |
| Acorn 20Mb hard disc | £499.00 |
| New RISC OS          | £35.00  |
| Postage is £1.00     |         |

A detailed information sheet is available upon request.

Prices include VAT, but please allow £1 postage (UK/CI/BFPO). Official orders welcome. Order with Access on (0752) 847286

Approved dealer



**IFEL**  
36 Upland Drive  
Derriford  
Plymouth PL6 6BD  
(0752) 847286



(0752) 847286





# OS and BASIC V Guides

Archimedes Basic Compiler Version 2 *the* Quality BASIC V Compiler  
OS Guide • BASIC V Guide • Shareware Volume 2 • Software Special Offers

## ABC Version 2 – Bigger, Better, and Faster!

Bigger! Better! and Faster than before! ABC2 is the quality compiler for the Archimedes and is now being used commercially by software houses around the country to develop their own products. Repton 3 and Presenter 2 are just two examples of what can be done with ABC. Here's what Archive contributor Brian Cowans said about ABC:

"...I can tell you now, I am very impressed. This is a superb package."

And the other mags...

"...Excellent Dabs Press product. Buy it!" RISC User

"ABC is a vital part of any programmer's toolbox, it puts compilers on other systems to shame. Unquestionably one of the most impressive pieces of software I have yet seen running on the Archimedes." A&B Computing

Here's a sample of what can be achieved using ABC2:

| Program             | BASIC | ABC2 |
|---------------------|-------|------|
| Repeat...Until Loop | 7.12  | 0.33 |
| While Loop          | 8.37  | 0.34 |
| For Next Loop       | 10.8  | 3.09 |
| Int-Array           | 1.16  | 0.41 |
| Primes to 7,000     | 4.13  | 0.18 |
| Fibonacci           | 7.86  | 0.34 |
| Ackerman (3,4)      | 3.32  | 0.11 |
| Triglog             | 1.20  | 3.43 |
| IntMath             | 1.76  | 0.02 |

### Features of ABC2

- RETURN Parameters
- Multiple ENDPROCS etc
- Double and Extended precision
- Local Error Handling
- RISC OS Desktop compatible
- Forthcoming support products
- 6502 generator available soon
- New version 2 manual
- Technical support and backup

Remember – ABC was written by Paul Fellows, head of the team responsible for the original Archimedes OS and many Acornsoft products. Still only..

**£99.95**

## Archimedes OS Guide

Do you have RISC OS? Struggling with Arthur? Then you need our Dabhand Guide to the Archimedes Operating System. This users guide explains how the OS works and shows you how to get the very best from it.

The price of the 320 page guide is just **£14.95** or **£21.95** including the programs disc (with over 40 programs) and manual.

Credit card orders  
always welcomed.

## BASIC V: Dabhand Guide

For anybody interested in BBC BASIC then this book is essential reading. Assuming a familiarity with BBC BASIC the various many new components of BASIC V are fully described using example programs throughout.

An essential aid for all Archimedes owners, and including coverage of RISC OS BASIC. Price **£9.95** – 128 pages – available now.

See us at the Acorn  
User Show - Stand 98.

## New! PC Emulator Shareware Volume 2

Now available is Volume 2 of the Shareware Collection. Some 4Mbs of PC software on five discs and tested with the emulator to ensure compatibility. Volume 2 includes a comprehensive database, text editor, typing tutor, astronomy package and much more. Price **£34.95**.

## Shareware Volume 1

Five discs as above, the collection includes software you would normally expect to pay a fortune for. Volume 1 includes a wordprocessor, spreadsheet, games, flowchart designer, printer utilities, and more. Price **£34.95**.

## Archimedes Games!

**Arctadium: Board Game Fun**  
Backgammon, Draughts, Reversi and Quadline – four games for the price of one! Just **£14.95**.

### Alerion: Arcade Action!

The highly acclaimed all-action shoot-em-up for the Archimedes. Impossible to finish! Superb fun! Price **£14.95**.

## SPECIAL OFFERS!

### PC Emulator & FREE Shareware

Purchase the Archimedes PC Emulator from us and we'll give you our Shareware pack – detailed above and worth **£34.95** – absolutely free of charge. Price just **£113.85** inc.

### ANSI C & FREE C Dabhand Guide

The best combination! Purchase Acornsofts ANSI C and we'll throw in our top-selling Dabhand Guide to C – 512 pages and worth **£14.95**. Price just **£113.85** inc VAT & p&p.

**DABS  
PRESS**

5 Victoria Lane (ARJ), Whitefield, Manchester M25 6AL

Tel: 061-766 8423 BT Gold: 72:MAG11596 Prestel: 942876210

Prices include VAT and P&P (UK/BFPO/CI). ACCESS/VISA accepted by post/phone/Mailbox/ in person. Cheques and POs to address above. Dabs Press products available from all good dealers. Add £2.50 (£12 air) if outside UK. Official orders welcome.

# Matters Arising

- **Zarch landscapes** – The program (program disc 2.6) had a mistake in it. Line 810 was OPT K% and should have been: 810 OPT opt

- **Hard disk backup** – Some bugs seem to have surfaced in Jonathan Marten's hard disc backup program published in Archive 2.5.

There is a problem if you are trying to back up a volume which has been partitioned for use with the PC emulator, which creates a single ADFS file as large as the MS-DOS disc required.

Unfortunately, there is no simple fix to that problem at the moment. Special code would be required to split up an excessively large file so that it would fit on a number of floppies, and so their backup problem would best be solved by using MS-DOS's own backup utility (which I believe can handle large files). Paul Hobbs' improvement (Hints & Tips in Archive 2.6) can be used to stop the program attempting to copy the offending tree.

A check can be added to ensure that a file will be skipped if it is too large to fit on one disc – this replaces the original PROCcopy:

```
DEF PROCcopy(src$,dst$,name$,len)
LOCAL need,J%

REM Find a dump disc with enough
  space, then copy the file
REM Don't copy the file if it is
  too large for one floppy

REM Assume the worst case extra
  space needed - i.e. all the
REM directories need to be
  created

PROCdelete(dst$+"."+name$)
need = len
FOR J% = 1 TO LEN(name$)
  IF MID$(name$,J%,1)=". " THEN
    need += &800
NEXT
IF need>&C7000 THEN
  PRINT "Warning: ";name$;" is
    too large - not copied"
```

```
ELSE
  PROCensure(dst$,need)
  PROCdelete(dst$+"."+name$) :
    REM disc may have changed
  PRINT "Info: copying ";name$;"
    size ";len;" from ";src$;"
    to ";dst$
  PROCcopy(src$,dst$,name$)
ENDIF
ENDPROC
```

The second bug was a time bomb that stops the program working properly (i.e. it copies files that have not been touched) after a certain date – fairly recently! Due to the peculiarities of BASIC V's integer/real arithmetic, there is a sign extension error in the calculation of a file's age from its date stamp. Even though real variables are used, BASIC seems to be treating them as integers with the consequent corruption of the top bit. The following replacement for FNstamp corrects this:

```
DEF FNstamp(load,exec)
REM Get file age (in units of
  about 2.5 seconds) from
  addresses
IF (load AND
  &FFF00000)<>&FFF00000 THEN
  = 0
ELSE
  = ((load<<24) AND
    &FF000000)+( (exec AND
    &FFFFFF00)>>>8)
ENDIF
```

Jonathan has provided a new version of the program (on the monthly program disc) which has all the various suggestions and bug fixes implemented and should perform as intended at all times of the year.

He's also working on a Wimp-interface version, as part of his campaign to encourage programs which use the Archimedes' features (especially the user interface) to the full. **A**



# RiscBASIC

## ARCHIMEDES BASIC V COMPILER THE BENCHMARKS

| † BENCHMARK           | †BASIC V | †ABC  | †RiscBASIC | RiscBASIC<br>/ABC Ratio | RiscBASIC<br>/BASIC V |
|-----------------------|----------|-------|------------|-------------------------|-----------------------|
| Name                  | secs     | secs  | secs       |                         |                       |
| Repeat..Until(100000) | 11.15    | 1.61  | 0.08       | 20.1 : 1                | 139.4 : 1             |
| While..Loop (100000)  | 8.70     | 1.58  | 0.11       | 14.4 : 1                | 79.1 : 1              |
| For..Next (1000000)   | 20.64    | 15.98 | 1.20       | 13.3 : 1                | 17.2 : 1              |
| String_Array(10000)   | 0.99     | 1.24  | 0.17       | 7.3 : 1                 | 5.8 : 1               |
| Integer_Array (10000) | 1.45     | 0.47  | 0.07       | 6.7 : 1                 | 20.7 : 1              |
| Real_Array (10000)    | 1.54     | 1.52  | 0.69       | 2.2 : 1                 | 2.2* : 1              |
| Sieve (1651 Primes)   | 5.19     | 0.52  | 0.07       | 7.4 : 1                 | 74.1 : 1              |
| Fibonacci             | 8.17     | 1.30  | 0.14       | 9.3 : 1                 | 58.4 : 1              |
| Ackerman              | 4.53     | 0.27  | 0.17       | 1.6 : 1                 | 26.6 : 1              |
| Grafscreen            | 1.67     | 0.95  | 0.80       | 1.2 : 1                 | 2.1 : 1               |
| Textscreen            | 2.51     | 2.29  | 2.24       | 1.02 : 1                | 1.1 : 1               |
| Realmath              | 0.25     | 0.31  | 0.26       | 1.2 : 1                 | 0.96* : 1             |
| Trilog                | 1.20     | 3.42  | 3.42       | 1.0 : 1                 | 0.35* : 1             |
| Intmath               | 1.76     | 0.37  | 0.17       | 2.2 : 1                 | 10.4 : 1              |

\*Using Floating Point Emulator

† All benchmarks have the ESC key enabled for fair comparison

### BASIC V Syntax & Keywords

|                                         | ABC | RiscBASIC |
|-----------------------------------------|-----|-----------|
| Full Array Manipulation Operations      | N   | Y         |
| Local Variables with true scope support | N   | Y         |
| Multiple entry to FOR, REPEAT...        | N   | Y         |
| Unlimited array sizes & dimensions      | N   | Y         |
| Runtime error handling & reporting      | N   | Y         |
| Full syntax implementation              | N   | Y         |
| SUM                                     | N   | Y         |
| COUNT                                   | N   | Y         |
| WIDTH                                   | N   | Y         |
| EVAL, INSTALL, LIBRARY                  | N   | N         |



RiscBASIC is the first true BASIC V syntax compiler which produces compiled code that executes up to 20 times faster than the rival ABC compiler and up to 139 times faster than interpreted BASIC V. The Syntax comparison table also demonstrates the completeness of RiscBASIC in implementing all compilable features in the interpreted BASIC V standard with only uncompileable features remaining unsupported.

Additional features include an optimising compiler, register variables for speed, relocatable modules, full cross references, Window-based or command line compilation environment, standalone code generation, in-line assembler with powerful floating point mnemonic extensions, Arthur & RiscOS support, comprehensive compiler directives, plus free updates for future extensions from a leading Software House renowned for technical excellence that makes RiscBASIC the best BASIC V compiler money can buy.

**RiscBASIC : £99.95 Inc VAT & Carriage**

*Available from your local dealer or direct by Cheque/Access from*

**SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW, MIDDLESEX,  
HA1 2AG, Tel: 01-422 2274, 01-861 2173, Fax: 01-427 5169, Tlx: 918266.**

# Help Needed and Offered

• **EPROM blower** – Does anyone know of an EPROM blower available for the Archimedes?

• **!Maestro** – The Maestro Music Editor supplied with RISC-OS is sadly lacking in the ability to insert, delete or copy one or more bars. Can anyone help? C Stevens, Surbiton.

• **RISC-OS fitters needed!** – I suspect that there will be a number of folk out there who would not really want to fit their own RISC-OS chips (or indeed hard discs or backplanes or whatever) and who find that their local dealers don't seem to have the time or the technicians to help. I'm sure too that there are a lot of folk out there who would be happy to assist others, either over the phone or by travelling a mile or two in the car. So, if you would be prepared to help out on a no-charge-no-responsibility basis, let us have your address and phone number. We will compile a list and make it available to anyone who needs help.

• **Voyager 7 problems** – I am having great problems getting a Voyager 7 Modem working. I have a lead which is working on the 300 baud test option. It will autodial for me. It is giving a few problems getting the carrier and when it does, it receives garbled data. I am using Arcterm 3 running under RISC-OS. Any clues?? Any Voyager 7 users out there had this problem? Thanks, Chris Furlong, Barnard Castle.

• **York Archivists** – Are there any members in the York area prepared to help with a graphics/sound project? If so, please contact Geoff Whitaker, 53 Thoresby Road, Acomb, York, YO2 3EN.

## Help offered

• **Machine Code fade** – thanks to Richard Millican, Martyn Lovell and Mike Atkinson, we now have a number of different fades. Two of them have been put on Shareware N°8 which is now available. One of them didn't lend itself to putting on a Shareware disc as it used a disc file of 400k of random numbers! John Wallace has also sent in a contribution but it arrived too late to get on the Shareware disc.

• **Continuous pitch variation** – The problem was to alter the pitch of a continuously-sounding note in response to some variable being measuring. Ian Nicholls has come up with at least a partial solution.

He has been able to put together a short program which alters the pitch of a sound continuously (and smoothly) as the mouse is moved up and down vertically. The secret is to note that the amplitude parameter of the SOUND command can take three forms:–

- i) a value in the range 0 to 15; this is retained for compatibility with the BBC micro
- ii) a value between &100 and &17F; this causes the existing note to be cut off and a new one with the new values of pitch or amplitude (or both) to be sounded
- iii) a value between &180 and &1FF; this is similar to (ii), except that the change to a new pitch or amplitude is made smoothly: this is the effect that we were after!

The demonstration program below shows how to use method (iii) to alter the pitch of a sound continuously by moving the mouse. I have used the StringLib-Soft sound on channel 1 (line 60), and started the sound on line 110. Line 240 is the one that performs the smooth update: note the value &1C0 for the amplitude parameter. I have tried to achieve the same effect with the amplitude of the sound, but without success! If anyone can see how to do this, let us know. (Dr J Wann)

```
10 REM > SoundDemo
20 REM I G Nicholls
30 REM 17 February 1989
40 :
50 REM Attach sound voice 2
      (StringLib-Soft) to sound
      channel 1
60 *CHANNELVOICE 1 2
70 :
80 REM Switch on the pointer
90 *POINTER 1
100 :
110 SOUND 1,&140,&4000,255
```



```

120 REM   move the pointer to the
           middle of the screen
130 MOUSE TO 640,512
140 Y=512
150 :
160 REM   read the mouse position
and convert the y value into
170 REM   a change of pitch, within
           an endless loop

180 :
190 REPEAT

```

```

200 MOUSE x,y,b
210 ydiff=y-Y
220 ydiff=ydiff*&2000/512
230 ydiff=ydiff+&3000
240 SOUND 1,&1C0,ydiff,255
250 UNTIL FALSE
260 END A

```

## Contact Box

• **Engineering Analysis** – Anyone interested in collaborating to write some engineering analysis programs, please contact Richard Offer, Colliers Lodge, Lower Writhlington, Radstock, Bath, BA3 5TY.

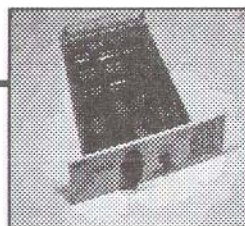
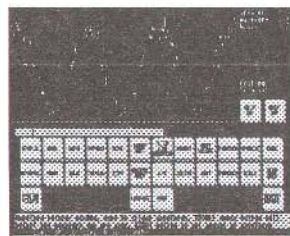
• **Gwent User Group** – Anyone in the Gwent area wanting to start up a User Group, contact A Aasim 69, Caerleon Road, New-port, Gwent, NP9 7BX.

• **Sutton Coldfield User Group** – Anyone in the Sutton Coldfield area wanting to start up a User Group, contact Peter Rogers, 1 Belmont Court, Duke Street, Sutton Coldfield, B72 1RJ.

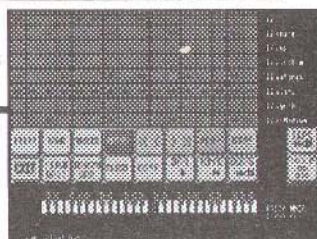
• **Dutch Users** – Can anyone in Holland help one of our subscribers who wants to know which macro-assembler to buy? He is Robert Borkent, Rivierenlaan 47, 3181 DM Rozenburg, Holland. **A**

Now do something really amazing with your Archimedes...

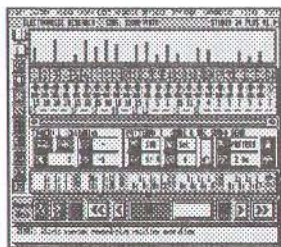
Sample a sound  
with **SAMPLER 8**



Edit a sound  
with **SOUNDSYNTH**



Play your sounds  
with **RHYTHM BOX**



or **STUDIO 24 PLUS**  
If you also want the  
ultimate Midi link

- and you'll be using a complete  
**EMR SoundStation!**

Write or phone now to find out just how  
creative you and your Archimedes can be!

**EMR LTD 14 Mount Close Wickford Essex SS11 8HG**  
Tel:0702 335747 Fax:0702 332370

# DiscTree – Search and Save

## Mick Dunford

DiscTree is the third piece of software for the Archimedes from Mitre Software: it was preceded by a database system (Flying Start II) and a Desktop Enhancer for Arthur. The new program runs only under RISC-OS and its most important use is to create and maintain backups of a hard disc.

### Disc analysis

Double clicking on DiscTree's icon will install it on the icon bar, and pressing the <menu> button reveals a list of discs that DiscTree can analyse. Selecting one of these discs will result in the appearance on the screen of a window in which the disc's hierarchical directory structure is displayed. This attractive indented display of directory names and icons is called a TreeViewer. You can move about the window, double click on directories to open up a standard display of the files they contain, and double click on application directories to run them.

A set of the directories on the disc can be selected for further operations and directories can be added to or removed from the set with ease. The selected set of directories or the whole disc can be searched for files that match a given file name and are of a given file type. (Wild cards can be used in file names but the specific file types one can search for are confined to the ones known to RISC-OS and depend therefore on which directories have been opened.)

The files identified can be loaded or executed, or loaded into an application. With the Beta Test version of the program I used, some curious results occurred when files were loaded into applications. In some, the hourglass remained on the screen working away until one returned to the desktop environment and exiting from the Draw application by clicking on its close icon resulted in an abrupt return to the desktop without the option of saving the file.

### The TreeViewer

The TreeViewer does provide an attractive and clear display of the directory structure, directories that are deeply nested can be found with ease and the file search options work well. As directories are added or deleted, however, the display and the directory list are not updated and the interface with filing system operations is limited: there are no facilities, for example, for copying, deleting or renaming subsets of directories or files except via the backup routines.

### Backup routines

The facilities for the creation and maintenance of backups and the file restoration programs are the most useful parts of DiscTree. The backup routines allow the selective backup of files on a hard disc onto a set of floppies. The directories to be backed up can be selected with ease and three sets of criteria can be applied to determine which files should be copied: the names of files, the type of file and the date on which a file was created or, if the application in which it was modified alters the timestamp, updated. The use of the timestamp enables an incremental backup scheme to be approximated.

The files themselves are not compressed. The files are however stored in a special format and are split, if necessary, to enable the backup discs to be filled and files in excess of 800k to be archived. (A full 20 Mbyte hard disc will therefore require about 25 floppies.)

### File restoration

A comprehensive file restoration program allows files copied onto floppies to be copied onto another disc. When it is run, the files on the backup disc are displayed, and the user can drag them into new locations or restore them to their former positions. One can choose whether to restore all or only a subset of the files on the backup disc or discs and it is able to decide in advance or as restoration proceeds whether particular files should be restored, whether existing files on the destination disc should be replaced and under what conditions.

### Documentation

The (temporary) photocopied documentation supplied with the review version of DiscTree was extremely clear and well presented, while the program itself is very pleasant to use, simplifies the task of making regular backups and has a very professional appearance.

### Conclusion

At nearly £50 for just over 100k of code and data (kept down in part through use of the Shared C Library) it is expensive. Some major application programs cost not a lot more. Mitre Software may feel that Archimedes hard disc users are few in number and that, for them, a hard disc backup program is indispensable. There are however some programs that do much of what DiscTree can do and which cost nothing. **A**



# TimeWatch

TimeWatch provides the tools to manage appointments, a 'To Do' list of tasks, and jogs the memory for those important birthdays and anniversaries. TimeWatch retains your information in pages - there is a page for each day of the year, for as many years as desired.



**Appointments.** Appointments for the day are detailed by start time, estimated duration and a descriptive note. All appointments for the day are displayed in time sequence.



**Short Notes.** Useful for jotting down a quick reminder, or notes of a telephone conversation.



**Tasks to do.** TimeWatch will help you plan your time and keep track of outstanding work by displaying your details of tasks in one of the categories 'Start Today', 'Ongoing' or 'Overdue!'.



**Birthdays, anniversaries etc.** Don't forget those things that should not be forgotten. Details entered in this category will appear on the same page for all years.

**Mitre Software  
Limited**  
International House  
26 Creechurch Lane  
London EC3A 5BA  
Tel: 01-283 4646

TimeWatch can also search for a piece of text in any, or all, of your categories of information; print some, or all, of the information stored in a range of pages; and, by means of the perpetual calendar, move quickly from one page to another.

For those who have made use of the Arthur 1.2 DeskTop Diary, TimeWatch will import the contents of the diary files.

## DiscTree



provides comprehensive, and easy to use, facilities to display the directory structure of a disc, search for files and backup files.

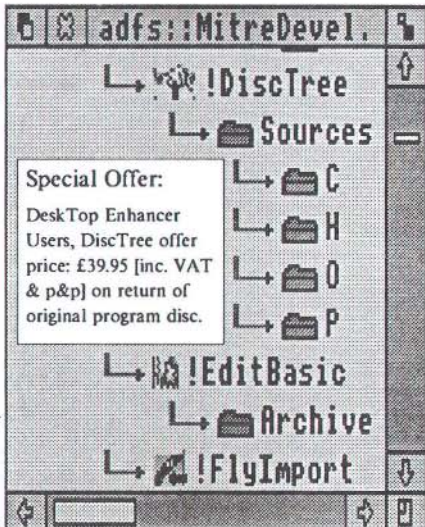
A TreeViewer provides the means to move rapidly around the directory structure of a disc and search for files. After specifying the directories to search, name and type to match the files found will be displayed, ready for loading into an editor.



A backup is performed after specifying the directories to search, file name, type and date to match. These criteria may be saved to a script file for fast and easy repeated use.



Backup copies files matching your criteria to floppy discs. Files are spread over many discs if required. Restore displays the contents of backup discs and allows the restoration of files by dragging to the required destination, or automatic restoration to their original locations.



DiscTree and TimeWatch are written specifically for RISC OS desktop and make full use of the WIMP, multi-tasking and inter application communication.

Prices: DiscTree: £49.95. TimeWatch: £29.95 (inc. VAT and p&p).

**Mitre  
Software  
Limited**



# Hardware Column – Tracker Balls

## Brian Cowan

I promised in an earlier issue to tell you about using tracker balls. As you probably know, a tracker ball is essentially an “upside down” mouse. The device sits still and you roll the ball around within its holder.

So what is wrong with the humble mouse? A mouse is fine for those tidy minded people who have plenty of bare space on their desk. It is even OK for those who manage to keep a six inch square area free for the mouse’s travels. Well on my desk there is not even one square centimetre of space free. I have developed a technique of balancing the mouse on my knee, and rolling it over my leg when required! In fact, months of practice have made me quite skilled at this so that I almost forgot my original plan of trying out a tracker ball.

## The Marconi RB2

I purchased a Marconi RB2 tracker ball from Farnell Electronics, catalogue number 176-922, which cost me £53.90, although I am sure you can get one cheaper if you shop around. One point to bear in mind is that the tracker ball is often sold together with software: you don’t want the software and it should be cheaper without. There are also uncased Marconi units available as well as smaller assemblies from other manufacturers. I have not tried these out, but I will let you know when I have. For the present I am concerned solely with the fully assembled Marconi RB2 unit, which comes complete with the three “selector” buttons.

## Making connections

The lead which comes with the tracker ball has a plug for a BBC user port, not the round plug for the Archimedes. There are two solutions to this problem. If the Archi- mouse lead is carefully removed from the mouse assembly, the Molex plug on the end will fit the tracker ball unit. You must carefully unscrew the four screws at the corners of the underside of the mouse. When the base is removed you must remove the screws inside so that the two boards can be removed. Then you can very gently prise off the lead connector from the pins on the larger circuit board. Having done this, I suggest

you assemble the mouse so that you don’t lose any of its parts. (*Sounds painful!*)

## Dismantling the unit

Next you must dismantle the tracker ball. There are four screws to be removed from the underside and then the top can be lifted off. It is advisable next to remove the black ball and put it somewhere safe (where it will not roll away). You will see how the lead comes into the unit above one of the stick-on feet. You must carefully prise that foot off to allow the old lead to be removed and the new one inserted. Don’t touch the sticky surface of the foot, then it will remain sticky so that it can be replaced.

## Connecting the lead

You will find three screws inside holding the tracker ball assembly to the case. These must be removed so that the old lead can be removed. Where it comes through the case there is a grommet which will slide down through the “foot hole”. After removing the lead, thread the new one through the “foot hole”, under the ball assembly and plug the Molex plug into the board pins. There are two ways round for this, ensure that the holes in the connector point outwards from the board. At this stage you can plug the other end into the Archimedes to test it out.

Assuming all is well, replace the screws fixing the assembly to the case, ensuring the lead is positioned underneath. It is also a good idea to secure the lead where it passes through the case with a clip. Then the adhesive foot can be replaced, the ball inserted, and the cover screwed on.

## Button functions

When you use the tracker ball, you will find that the functions of the left and middle buttons are interchanged. I was tempted to perform the minor surgery to change this, but then I thought again. The centre button is rather larger than the other two, so it is quite natural for this to be the “select” key: one’s fingers naturally rest here. So the left button now becomes “menu”. (There are of course problems with software which refers to “left” and “right” buttons, as well as packages giving screen displays of button functions, such as Silicon Vision’s ARC



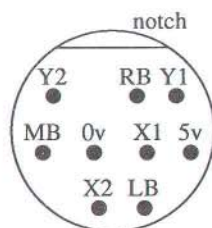
PCB.) What do our readers think? Should the functions of the buttons be swapped to make for compatibility with the mouse or not?

### Making a new lead

What if you don't want to lose your mouse? Then we go for the second solution, using a new lead and plug. Unfortunately, as far as I can ascertain, you can't purchase the round mouse plug separately. I think this is because the connections are so small they can't be soldered, but must be crimped. I am grateful to Chris Bass of Grimsby, who has found a source of supply for the mouse plug/lead assembly (it is the same as the IBM PC-AT mouse lead). Chris has written in explaining how he connected this lead to the Marconi unit. The lead may be purchased for £13.80 from HCCS Associates Ltd. Since you can't remove the lead from the plug, you must connect the lead to the tracker ball. Much of the tracker ball dismantling instructions above therefore apply.

### Lead connections

The first thing you must do is to trace which pins of the plug connect to which wires. The connections on the mouse port socket are as follows:



- X1 : X direction
- X2 : X step
- Y1 : Y direction
- Y2 : Y step
- LB : Left button
- MB : Middle button
- RB : Right button
- 5v : +5v. power
- 0v : Earth

The corresponding connections to the tracker ball and the Archimedes mouse are:

| Pin No. | Archi.<br>mouse | Tracker<br>ball |
|---------|-----------------|-----------------|
| 1       | 5v              | 5v              |
| 2       | X1              | X1              |
| 3       | X2              | X2              |
| 4       | Y2              | Y2              |
| 5       | Y1              | Y1              |
| 6       | MB              | LB              |
| 7       | LB              | MB              |
| 8       | RB              | RB              |
| 9       | 0v              | 0v              |

See that these are identical except for the interchanged left and middle buttons.

There are a number of ways that connection may be made from the lead to the tracker ball pins. Chris purchased a 10 pin header connector and crimp terminals from Electromail, part numbers 467-677 and 467-598 respectively, to make up the 9 pin connector for the PCB header plug.

### Conclusion

I am very pleased with my tracker ball, although I intend following Chris's advice, and purchase a lead so that I can have my mouse back. Chris also is happy with his result, "... it worked fine, the action being both positive and accurate, ideal for art and CAD. My only criticism is that you need two hands when simultaneously holding down the select button and moving the ball." It is only this problem with "dragging" where the tracker ball is a little awkward. Any one got any ideas about this?

*I have found a source of the 8-pin mini DIN plugs! You can get either a 'standard' version for £2.80 or a 'professional' version for £4.20, both inc. VAT & p&p from The Macintosh User Group, 55 Linkside Avenue, Oxford, OX2 8JE. 0876-58027. (They take Access but not Visa.) So, if you are prepared to have a go at soldering these things, you can save yourself some money. But be warned, I soldered 5 wires onto one of those plugs to link my Mac up to the BBC Micro, and it was very difficult. To solder 9 wire will be horrendous unless you have a very delicate soldering iron and a very steady hand. Ed. **A***

### Come and meet us at the show!

We will be on stand 93a at the Acorn User Show July 21st – 23rd at Alexandra Palace.

It would be nice to meet you face to face – share the latest news, bring your ideas and criticisms and meet some of the contributors.

Thanks for the offers of help that people have given already, but our stand is the smallest in the show, 1.5m by 2m, so there will just about be room for me and one other person on the stand at a time. Still, come and gather round – a crowd always attracts a crowd! Ed.

# Language Forum

## David Wild

This month's edition of language forum is slightly shorter than usual, I'm afraid. There are two reasons for this. The first is that I have been rather short of time, largely because of the Easter break, and the second is that I have had no letters from readers during the last month.

Your letters are always welcome and very important because, even when you don't agree with things that I have said, this is the only way I have of finding out what interests you.

## Random numbers

One thing that does seem to interest many people is the generation of random numbers for various purposes. These should, of course, be called pseudo-random numbers but as everyone leaves off the prefix I will do so too. There are many random number generating routines in the literature, but I can't reproduce most of them because they are covered by copyright.

It does make sense, though, to talk about why we should want the various different methods and what you get for your money. The two most important aspects are efficiency, in terms of time taken, and the "level of protection" that you get. This level of protection has to do with why you want the random numbers. I've just bought a new CD player and one of the features offered is a facility to play the tunes on a record "at random" with the order chosen by the device. For something like this it doesn't matter if the pattern repeats after a hundred or so tunes because nobody is likely to listen to the thing for so long. It is equally immaterial if there is a pattern in the randomness, because all we are trying to do is to put a little variety into some background music. (I've only used it once, to try it out, and didn't notice a pattern in the time I could stand the record.)

In some applications, we want something a little better than that, perhaps because a pattern would be noticed fairly quickly, but do not need scientific rigour in selecting our numbers. Some games are an example of this, where fairness between players may be more important than the probability of throwing a six being exactly the same as that of throwing a one.

On other occasions we need full assurance that our numbers really are as random as possible with computer generation. "Ernie" is a good instance of this, and it has been necessary to use cosmic radiation to provide the randomness that is needed.

I have managed to produce a Pascal program including a random number facility which is "seeded" by reading the number of milliseconds which have elapsed since the computer was switched on. As it stands, it offers random integers in the range 0 to 8192, and it should be good enough for use in most circumstances.

It is based on a routine published in "How to Solve it by Computer", by R. G. Dromey and a review of this book is given below. Dromey points out that there are conditions attached to the choice of multiplier. As the modulus increases, the multiplier should grow so that it is larger than the square root of the modulus, but not larger than the difference between the modulus and its square root. If the modulus is a power of two, the multiplier should be of the form  $\text{mult mod } 8 = 5$ , and  $\text{mult}-1$  should divide by four if the modulus divides by four.

During the next month or two I hope to produce a Pascal module incorporating various randomised facilities and I hope that it will appear on one of the monthly discs.

```
{ >pas.testrandom }
program testrandom(output);
const
  OS_ReadMonotonicTime = 66;
  R0                     = 0;
var
  loopcount : integer;
  starttime : integer;
function readtime : integer;
var
  timeslot : integer;
begin
  *SWI_OS_ReadMonotonicTime;
  *STR_R0,timeslot;
  readtime := timeslot
end; {readtime}
function random : integer;
static seed : integer;
```



```

static done : boolean := false;
const
  mult = 109; { mult will need
               changing if modulus is increased }
  incr = 853;
  modulus = 8192;
begin
  if not done
  then
    begin
      seed := readtime;
      done := true
    end;
    { this ensures that we
      have an unknown start }
  seed := (mult * seed + incr) mod
modulus;
  random := seed;
  seed := seed + readtime
    { this ensures that the
      sequence changes }
end; { random }
begin
  starttime := readtime;
  for loopcount := 1 to 100 do
    writeln('The number now is ',
      random:4, ' on try ', loopcount:3, '
      after ', (readtime-starttime)/
        100:6:3, ' seconds. ')
  end.

```

### Pascal static variables

Although the manual does not say so, you can incorporate static variables in procedures or functions that are not part of a module. There is, of course, no point in including them in the main program as the main program variables remain for the duration of the run. The big advantage of using them in a routine is that it makes it possible for a routine to know whether it has been called before, without using a global variable.

The manual does not give you any help with this and it took me some time to crack the code. When I tried to use them I kept getting "unaccountable" errors although I thought that I had put everything correctly. It turns out that the word "static" must appear on the same line as the name of the variable, even though the Pascal custom is that program layout is ignored in interpreting the source file. I had written:-

```

static
  varname : integer;

```

to look the same as the "var" and "const" declarations, but in this case it is wrong.

### "How to Solve It..."

Recently I have bought two books with a title including the words "How to Solve It". The first, and oldest, is R.G.Dromey's "How to Solve it by Computer", published by Prentice-Hall as long ago as 1982. The treatment is highly mathematical, in that the author aims to show how each routine can be proved to be correct, but many aspects of non-mathematical computing, such as linked lists, tree insertion and deletion, sorting, searching and text pattern matching are covered.

The treatment is nowhere near as deeply theoretical as the books by Knuth, and all the examples are in Pascal, making it much more accessible for most users. In addition to the detailed examples which can be incorporated into your programs directly, there are many other methods described – and it is not difficult to write the additional code for these.

At £18.95 it is not cheap but if you accept that even hobby time has a value, the acquisition of even two or three usable routines will pay for the book in very short time.

The other book of the pair is "How to solve it in LISP" by Patrick J.Hall. It is an extremely interesting but absolutely infuriating book. It is interesting because it is absolutely full of ideas for using LISP, even in circumstances where you might not have considered it.

There is, for example, a routine for testing whether or not a number is prime, and then for generating all the primes up to a given number. Now I realise that such routines exist for most languages, but the beauty of those in LISP is the very concise way in which they are expressed. These routines work as printed but the infuriating part is that when you examine them, they do a great deal of unnecessary work. To find out if 1009 is prime, Hall would divide it by every integer from 2 to 1009!

I was, however, tempted to improve on his work and it is interesting to see the prime numbers from 1 to 10000 appear on the screen as fast as you are able to read them.

More useful and interesting, however, is the work on databases. One of the disadvantages of the standard database program such as dBase is that you need to define the fields that you will use beforehand, and this leads to a lot of wasted space if many of the fields are used rarely. Viewstore helps in allowing variable length records but still leaves the problem of field definition. For many tasks, such as customer or staff records, this is not serious but if you are doing research for something like history or biography, you may not know what is significant until you find it.

This is where LISP can be useful even to those who do not have an active interest in artificial intelligence. By using such things as property and association lists we can store information about our subject in the places where it belongs – and still be able to find it afterwards. Hall provides a simple

database relating to children's pets and points the way to extending it to a more useful solution.

There is work on artificial intelligence and on statistics but I have not yet had time to try all that is offered. The statistics provides another "own goal" where he provides a "practical" random number routine but fails to notice that it doesn't really work, even though the printouts from his program show that very few different numbers are generated and that it never generates a number less than 31!

The book is published by Sigma Press at £12.95. If you are thinking of trying LISP you should buy the book for the ideas it contains, but you must examine every routine carefully before using it. One of the side-effects of reading the book is that I have begun to realise how much better Archimedes LISP is than the Golden Common LISP which Hall uses, but I still wish that it was more robust. **A**

## First Word Plus Forum

### Mike Hobart

#### First Word Plus Extended Dictionary

I was asked to review the First Word Plus Extended Dictionary which is available from Science Frontiers. It seems unfair to review it in only one paragraph, but Paul's maxim is, "Space in Archive is at a premium, so say what is worth saying as briefly as possible, then shut up!" (*Well, that's the jist of what I say!* Ed.)

First Word Plus Extended Dictionary comprises an 80,000 word dictionary which replaces that in the Acorn package, and three specialized supplementary dictionaries covering computer terms, geographical locations and Christian names. It is an entirely competent package, though necessarily not the most fascinating in content. If you need more words in your dictionary, buy it, but if you need to work with large documents, do not load it, as bigger dictionaries do take up more space.

FWP Extended Dictionary costs £6.95 (£6.50 from Archive) and is produced by Science Frontiers.

#### From FWP to DTP?

Although it is not strictly the business of the First Word Plus column, I took a good look at the Desktop Publishing program when visiting the

Acorn stand at the Which Computer? Show. It should be available a few weeks after RISC-OS and is reported to be "finished" and about to go into production. However, it was apparently not the "finished" version at the show. My informant assures me that the production version will be even better, which should certainly be good indeed. Even the present version has a 'secret' feature which is quite impressive and even Apple cannot match it.

#### <ctrl-A> Solution?

I have discovered why my "<ctrl-a> makes a bleep" modules reported in Archive 2.5 p. 18 absolutely refused to work: the answer is on the top of page 34 of the Programmer's Reference Manual: never use OS\_WriteC routines when you have intercepted an interrupt. The solution (but don't hold your breath) is to insert a <ctrl-g> into the input buffer. This works absolutely perfectly – except in FWP, where it is interpreted as a call to read the ruler!!

No-one else has produced a solution which actually works, so the small prize is still unclaimed.

#### Shareware disk N°6

We get a lot of enquiries about printer drivers. The problem is that we do not have that many different kinds of printer, so cannot help much. Besides,



printer drivers are (however necessary and satisfactory a solution they may be) a pain and a bore, except when they are to drive the printer you use. I am trying to compile a disk of all the contributed "goodies", especially printer drivers and related information and ideas. If you have a contribution, please let me have it in the next couple of weeks. We have printer drivers for: Taxan-Kaga KP810 = Canon PW 1080; Citizen 120; Epson LX800 and LQ500; Star LC10 and NL10; Panasonic KXP1080; H-P DeskJet. Quite a few of these have interesting variants and associated ideas which may be useful for doing the special things you want to do with your printer.

Once the shareware disk is available, printer driver enquiries will be at the bottom of the pile!

*(Mike sent me a pre-release version of this which I published as Shareware N°6, thinking it was the finished article. Oops! We will continue to supply N°6 as it is and then offer free up-grades when the final version is ready. Sorry about that! Ed.)*

## Two related matters

• If you get the monthly disk, you will probably have installed the **IntModule** from Steve Hoare (Archive 2.6, p. 44), and you will agree with me that it is quite the best thing that has happened to First Word Plus since its launch! I am sure that my life-expectancy has been increased by being able to access the "\*" commands we all love (and hate). If you have not installed it, copy the IntModule to your 1st Word startup disk, then modify !boot by adding lines 23 and 26 as follows:

```
23 *rmrun IntModule
26 *Interrupt 15
```

Now if you press <ctrl-o>, the screen goes bright blue and gives you a \* prompt. Create your directories, mount disks or whatever, then just \* <return> and you are back. Wonderful. If you do not get the disks, more fool you, this one was worth a year's subscription, but it will be on the proposed "shareware" disk.

• **Just who do you think we are?** Not very different from you is the answer, I guess. I suspect that most of the contributors to Archive are either people who enjoy computers as a hobby which

can be useful, people who use computers as part of their work, but are not professionals in computing, or students or teachers of computing. I am actually a vet. who does human genetics and immunology research, approaching fifty, bald and paunchy! The point is, please do not expect too much from us/me. I actually took this column on when a broken collarbone got in the way of decorating! Sadly, bones heal...

## Two quickies

- If you have more than one sprite in a file, FWP only loads the first sprite.
- There is a funny bug in the spelling list : FABRICATION is flagged as wrong, but it appears when you browse. To add confusion, when you ask to guess, it comes up with faArication, which is unbrowsable!! Thanks to Colin Garlick. A review of letters received earlier reveals that the problem is more widespread than this: Kenneth Gardner reports that the same (?) bug affects fable, fabric, -ate, -ated, -ation, fabulous, -ly, fab, haar, maar, nascelle,

Science Frontiers software...

## First Word Plus Extended Dictionary

\* 80,000 word  
Main Dictionary

\* Specialised  
Supplementary  
Dictionaries

(Computing Terms, Proper Names,  
Geographical Locations)

£6.95 inclusive

Order from: Science Frontiers  
7 Porthill Court  
Aberdeen  
AB1 1DU.

oaf, zag. Kenneth provides more data on making merged supplementary dictionaries, but the problem is obviously a bug. Over to you Acorn!

### FWP and RISC-OS...

The support disk which comes with RISC-OS has the necessary instructions for conversion and the files. It is in the Acorn directory.

It may be easier to have Edit installed and the mode set to 0 before you start. Then you can have a decent RAMfs space for the copied files (assuming you do not have two drives). You can keep the instructions in sight this way.

### ...and the IntModule

It is all quite smooth, but if you want the splendid IntModule facility to give you access to the OS, it is a bit more complicated. Edit has no "load" command. You load things by grabbing their icons and dropping them on the installed Edit icon. But it is not obvious how to get at the "Obey" files in the !1stWord+ directory from the desktop. The secret is to hold down shift while clicking on the !1stWord+ directory. You should be a bit careful about what you do, so make a backup before mucking about. Now edit it as follows:

- a) (This is most important.) Rename the !Run file you got from the Support Disc as, e.g. !RunAcorn.
- b) Insert three lines before that beginning "run" (next to last) (the third line is optional – it turns the caps lock off)

```
rmload $.intmodule
interrupt 15
fx202,48 REM
```
- c) Save as !Run
- d) Check that the file type is obey. If not, get an OS prompt by pressing f12 on the desktop and "Setfiletype !run obey".
- e) Remember to copy IntModule onto the disk in directory \$.

It should work, accessing the OS when <ctrl-O> is pressed, though I get a white border around the top and right after going to the OS but it seems to go away, though.

I suspect there are a few missing twiddly bits about

ensuring that the correct directory names are used, so I still have some reading to do. More next month!

It also happens that you can edit obey files in FWP, and further, FWP is not squeemish about loading the "Obey" files from an application directory. If you do this you will certainly have to set the filetype.

### First Mail

Here are a couple more tips on 1st Mail from Glyn Emery:

Mail merging normally means sending the same, or very slightly different, letters to a number of recipients. I recently had occasion to turn this process on its head and send several different letters to the same recipient; but I found 1st Mail up to the task. The occasion was that I had to write reports on a batch of candidates, which, for the convenience of his filing system, I prepared in the form of a batch of separate letters all addressed to the administrator involved. To print them I prepared a "merge from" file as follows:

```
read text
display "text letter started"
includefile letterhead
includefile dat.administrator
Dear Mr Administrator
includefile doc.text
Yours sincerely
display "letter finished"
repeat
```

"text" here is used as a 1st Mail keyword. The file "letterhead" incorporates the date. I put a hard page break just before the repeat command to make the sheet-feeder on my printer pick up the next piece of A4. The "display" commands were put in during development and proved to be too confidence-giving to be deleted. The file dat.administrator is the administrator's address.

The reports, together with a covering letter were prepared as separate files; and a datafile was prepared listing the file names. This was saved in the dat. directory, not forgetting to switch off WP mode before saving it. If you don't switch off WP mode the merge tends to "hang". I don't know why.



The second point is that I have incorporated Steve Hoare's IntModule (Archive 2,6 p44) into the libraries of my letter-writing discs. Unfortunately Steve's suggestion to use <ctrl-@> does not quite work for me, because the £ key seems to return ASCII 0 in the First Word Plus context, presumably in order that different codes for £ can be included to satisfy different printers. Steve, being in America, probably had no occasion to notice this. What I did in the end was to include

```
*RMLoad %.IntModule
*Interrupt 205 1stMail
```

into the startup program for First Word Plus, and

```
*RMLoad %.IntModule
*Interrupt 205 1stWord+
```

into the startup program for 1stMail. I can then use the "insert" key to toggle between the two, and save quite a lot of keystrokes in doing so. Notice that I had to use % in the RMLoad command but not in the Interrupt command because % appears in my Run\$Path but not in my File\$Path.

## An interesting application for FWP Dave Livsey

Those of you who, like me, have to report on the progress of large numbers of individuals of various levels of ability (i.e. teachers!) and are the proud possessors of an Archimedes and First Word Plus now have the means to reduce the increasingly onerous task of reporting, imposed by the introduction of 'records of achievement' (ROA). (If you do not have First Word Plus, or something better, you deserve all the hard work you have to do!) Using First Word Plus, it is fairly easy to set up a 'Mail merge' which will print out the documents required for the ROA.

The clue to doing this lies in the example mail-merge letter on the First Word Plus disk. As with most problems, there are probably many (or, at least, a few) different solutions – this is one. I hope it will help reduce your load as much as it has mine!

In all that follows, the underlined words below are supposed to be in light type which I am unable to print in Elite type. The page numbers refer to the First Word Plus handbook.

In outline, you will need to set up four files: a command file, a data file, a file containing the comment bank and the 'main' file (which corresponds to the letter in the mail-merge example).

**The command file (called 'command'):** This needs to contain the information which indicates the location of the data file (see below), any individual input to the ROA document ('input' typed in 'light' type p.165 – 169) and a reference to the basic form as an 'includefile' statement. The WP mode can be left switched on when creating this file and saving it.

**The data file ('formdata')** must be created in the dat. directory and contains only the data you wish to be inserted into the final document as it is printed and is simply a list of names (firstname, secondname), sex (He/She), tutor group (or Form, or whatever cockeyed system your educational establishment has decided to inflict on you), date and any other required information. As pointed out in the handbook, each item of data must be separated from the next by a comma. There is also a problem of commas in an item of data but this is catered for by enclosing them, as explained on p.165. A specimen layout could be as shown: Fred,Bloggs,He,4Z,Nov 1988,Swahili

Note that the data fields are comma separated fields and may include spaces (p.165). This file must be created in non-WP mode and the mode left switched off when saving; ignore the pop-up reminder which appears when you try to save the file.

**The comment bank file ('ROA'),** obviously, contains all the comments which you may wish to make about any group of students. Each comment is prefixed by a suitable identifier e.g. K1. In order to be able to use these comments, each identifier must be set up as a keyword (p.163) by preceding it with 'setval' in light type e.g.

```
setval K1, "name1 is a complete idiot
when it comes to practical work. sex
is a complete liability as sex has 11
thumbs on two left hands."
```

Note the <,> and the <">. I found that it was easier to type the comment with the WP mode switched on and then to switch the WP mode off and move all the

text onto one line. The WP mode was then switched on again as the document does not print out correctly otherwise.

The setval definition seems to need all the text on one line but as this can be 160 characters long, that is not too much of a problem. These definitions can also contain key words, in light type, for insertions from the data file into the final document. This is useful as it means that you can specify he or she along with the name in the data file. N.B. Changing the ruler turns off the 'light' type causing the definitions and insertions to be ignored in the final print-out.

The final file (called 'form'); the document you are going to print, contains very little other than keywords spaced out as is appropriate for your ROA. The first line must be a read statement which, being a keyword is in light type. Following this is a list of fields in ordinary type and in the same order as in the data file. The rest of the file is mainly spaces preceded by a keyword placed where you want your printing to be done. Eg.

```
read  name1,name2,sex,date,tutor,  
subject (reads from 'formdata')
```

```
name1, name2 tutor subject date
```

```
includefile ROA (this reads in the  
comment bank)
```

```
name1 K1 (prints "Fred is an idiot  
.....")
```

```
sex C3 (prints in the comment on  
comprehension)
```

```
sex I1 (prints in the comment on  
intelligence) etc.
```

This file will, of course, need the WP mode switched on in order to retain all the formatting information which is necessary for the automatic formatter to work when insertions are made in the text.

The ROA is printed out by clicking on 'form' and 'formdata' (from the doc. directory) using the mail-merge facility on the First Word Plus disc. Full details of this are given in the Handbook.

## Font Fiddling on First Word Plus Reg Dalton (& Steve Bass)

*Reg tells us the saga of creating character sets for First Word Plus and his NEC P2200. A sample printout is shown opposite, and the programs and printer drivers are on the program disc and downloadable from Eureka II.*

In an earlier edition of Archive (1.12 p 7) was printed a short routine to convert the extra fonts, supplied on the Master Welcome disc, from BBC to Archimedes format. On the face of it, this looked as if it would be a useful little routine but there was a problem; only half of the character set was defined. i.e. characters 32 to 126. My friend Steve, in his wisdom, decided that one of the fonts (7by8) looked very good with First Word Plus and decided to redefine the rest of the characters to match the ones already done.

The next step in the story was when I foolishly mentioned that it would be quite simple to set up First Word Plus to utilise the IBM graphics available in one of the alternative character sets within the printer we both had (NEC P2200). We then decided that redesigning the fonts using the Master was not the way to do this, mainly because the fonts would then have to be converted to Archimedes, so we converted the CHARDES program, which was mainly in BASIC, to a form that would save fonts in the correct format and also run with the Archimedes mouse.

The problem of modifying the program to work on the Archimedes was not too difficult by even an amateur programmer's standards but to make it save the font in its correct form for the Archimedes proved more problematical. A number of abortive attempts were made to rewrite the save font routine but each time nothing was achieved except making the computer's character set look like hieroglyphics. Eventually, it all fell into place and we had a working program.

We then decided that a program for transposing characters within the character set itself might not be a bad idea. This was written fairly speedily, but then the next task was to create the printer driver for First Word Plus. This marathon is usually achieved

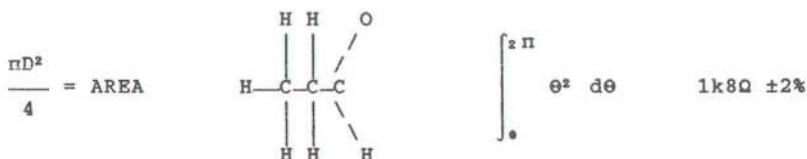
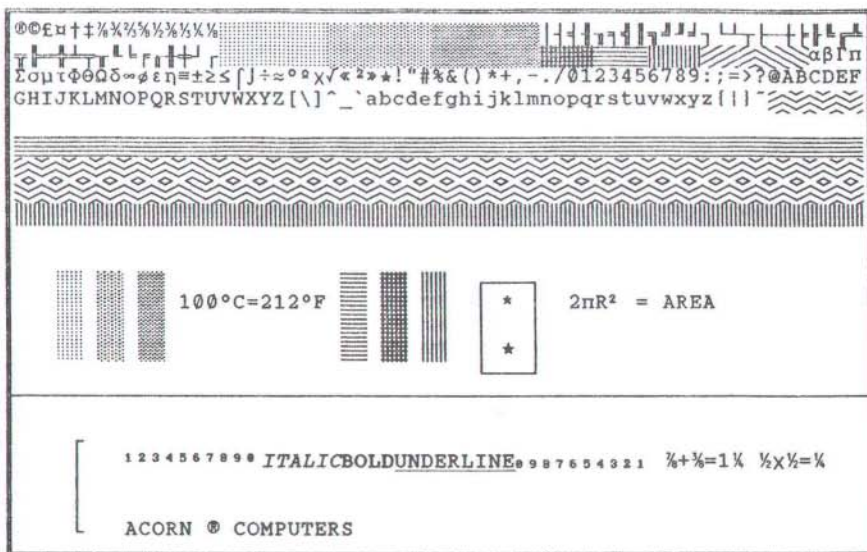


by modifying an existing wordprocessor/printer driver file, which involves changing the relevant values for the various functions listed within the file, e.g. superscript, subscript, nlq etc. After this fairly simple part comes the task of entering all the codes to achieve the extra characters which cannot enter from the keyboard. For characters 32 to 127 this was obviously quite simple as all that was needed in this instance was each character's number, but it was soon noticed by both of us that the characters between &80 and &9F (decimal 128 to 159) were not defined by the existing list. After an abortive attempt to define these characters, and failing to get them to install, it was decided that we would have to discard 32 (yes a whole 32) of the characters so lovingly designed by Steve.

### Notes on the font fiddling programs

(These refer to programs on the monthly disc.)

- 1 !BOOT is the program for interchanging the position of the characters.
- 2 After running the above program, the Acorn Character Designer Program (modified for use on the Archimedes), Chardes\_C, can be entered and 1 above repeated as many times as necessary.
- 3 The modified Printer driver for 1WP is in the CFG directory.
- 4 The modified Printer driver hex file for 1wp is in the HEX directory.
- 5 Before booting the disc, the font style to be modified must first be loaded e.g. by using \*NEC\_Afont. **A**



Sample Printout from NEC P2200

# Emacs – A Text Editor

## Peter van der Ploeg

One of the applications you'll surely need is an text editor. RISC-OS has one supplied but Arthur hasn't. In this review I will take a look at an editor, Emacs, which was originally written for mainframes in the seventies at the famous Massachusetts Institute for Technology. Since then, there has appeared a version for every self-respecting mainframe, mini or micro computer. Emacs has always been and still is public domain. It is written in C, and David Pilling (of Hearsay fame) has converted it to the Archimedes.

## What you get

Well, you get only one disc. As usual with public domain, the manual is on the disc and you'll have to print it (with \*type). The manual is well-written but has the page breaks at the wrong places. I had to use that even older editor, the scissors! The manual is too long for my 305. Also on the disc are a tutorial, a help file and some macro files which further extend the system. There is no documentation for these macros however.

## Can's and can't's

Emacs does not use the WIMP system and has no mouse support. Apart from this, it has nearly everything you can dream of. You can have resizable and moveable windows (ARMBE-style windows). You can have more than one document in memory (called buffers) and use the windows to look at different (or the same) buffers. There is a bug here, when you try to open a new buffer and all memory was used up already, the system exits with an error and you lose your text (on my 305). Emacs supports all normal edit functions, blockmove, blockcopy, search & replace with a powerful wildcard system etc, etc. You get at these with rather awkward keypresses. For example, you enter the help facility by pressing <ctrl-X> and then <?>. But no panic here, the whole keyboard can be redefined. If you get used to it, the default system doesn't turn out too bad – there is some elegant logic in it.

## Macro Language

The real power however is in the macro language.

This is a full blown programming language aimed at string and text manipulation. A newly defined function can be bound to any key, executed from a file or used in other macros. Alternatively you can record a macro (but only one) from the keyboard.

When Emacs is entered, it loads up a startup file and executes the macro-commands stored in it. Of course, you can change these. There is a help facility and files can be protected by a password. Another nice touch is that you can repeat every function an arbitrary number of times by preceding it with pressing <escape> <anynumber>. Now I now where Word Perfect got that idea from!

Emacs even has some wordprocessing facilities. It can word-wrap and reformat a paragraph. Some macro files on the disc seem to add extra features to this, but I haven't figured it out completely. But be aware, compared to a real wordprocessor it is clumsy and lacking many features.

## Now the bad news

There are some things I don't like. When you try to scroll the screen, it doesn't scroll but jumps by about half a screen. Also there is no way to find out how much memory is still free. There is no support for the 132 column modes. I encountered another problem when I tried to load an ASCII file saved by Emacs into View. It turned out that Emacs uses the linefeed (10) character as line separator, this opposed to View, GraphicWriter and \*Build, which use a carriage return (13). The only other bug I found is in the entab/detab function. It should convert tabs to spaces and vice-versa, but it sometimes does a lot more than that to the text.

## Conclusion

Emacs is not easy to use – you'll have to remember a lot commands, but if you're going to use it often, it is certainly worth the effort. In this review, I could only touch on some of its features – the full set is very impressive. I don't think you'll find a commercial editor that has more features. If you take into account the price, you can't go wrong. Buy it.

Emacs, available from David Pilling for £5.99. **A**



# PIPEDREAM

POWER AT YOUR FINGERTIPS

## PIPEDREAM

- o The best word processor for the Archimedes. It has dynamic on-screen page breaks, multi-column text and 'live' embedded numbers and calculations.
- o The fastest and most powerful spreadsheet for the Archimedes. It can sort, format text around numbers and store and quickly recalculate large models.
- o The most flexible database for the Archimedes. It can store a huge number of fields, search, sort and select records and have fields which are calculated from other values.
- o Complete integration of word processor, spreadsheet and database – no need to exchange data between several programs.
- o A mail-shot program which can store names and addresses, write the letter to send to them and selectively mail to each one, including calculations.
- o Ideal for writing invoices, statements and estimates: the text and figures can fit easily into a pre-designed form – and, of course, the figures are 'live'.
- o An excellent way to record customer or sales information: keep a database of sales leads, sort it on different criteria, produce the required totals and select and print out the key information.
- o Compatibility with 4 different computers: the BBC Micro, the Acorn Archimedes, the Z88 and the IBM PC.
- o A pull-down menu and help system to make it easy for you to get started.
- o Built-in file transfer with PipeDream on the portable Z88 so that you can continue work away from your main computer.


## SPELLCHECK

- o PipeDream SpellCheck is now available, with a dictionary of 93,003 words and the ability to check over 40,000 words per minute on the Archimedes.

## VIEW PROFESSIONAL

- o The BBC Micro version of PipeDream which provides complete file compatibility with PipeDream and with the Z88 and which shares many of PipeDream's features.

PipeDream costs only £99.00 plus VAT, View Professional £60.00 plus VAT and SpellCheck £43.00 plus VAT.

To order PipeDream, View Professional or SpellCheck, or to find out more, call us on 0954 211472. You can pay by VISA or Access by phoning us with your card number. 

colton  
software

FOR A FREE BROCHURE, COMPLETE AND SEND THIS COUPON

PipeDream ☐ View Professional ☐

RUS/89

Name

Address

Post Code

COLTON SOFTWARE, BROADWAY HOUSE,  
149-151 ST. NEOTS ROAD, HARDWICK,  
CAMBRIDGE CB3 7QJ, ENGLAND.  
FAX: (0954) 211607

# BASIC V Forum

## Clifford Hoggarth

This article was originally supposed to be a comparison of BASIC V under Arthur 1.2 and RISC-OS. However this could not be completed in time, so I shall just wet your appetites by saying that there is a much greater difference between v1.02 and v1.04 than the simple addition of a few new commands. More next time.

### Data Validation and/or Error Trapping

Instead, I want to write a short reply to the comments on data validation and error trapping in last month's Language Forum.

I entirely agree that data validation is a much better method of handling data input problems. However I disagree with the comments about error trapping which I feel is vital!

It is very important, as suggested, that invalid data is tested for at the time it is entered in, as this is the best time to correct it. However, even if your data is validity checked, I think it is good practice to trap errors, as it is always possible that a user of your program will think of something you haven't allowed for. Error trapping should increase user friendliness, by allowing continuation of a process after suitable corrective action, overcoming the otherwise unfriendly standard error action of the program stopping.

Every program should have at least a global error trap even if it does not check for any specific errors, because many error-generating conditions are beyond the control of your program – disc errors being a typical example, but to list a few of the other possibilities specific to the Archimedes...

**Wimp errors** – some are totally unpredictable e.g. it is possible for SYS "Wimp\_Poll" to fail on occasions.

**Memory access errors** – this is especially true with RISC-OS where the memory map keeps changing under multi-tasking.

**Module errors** – as a programmer, you do not know what modules a user may have loaded, and he (or she) may have deleted one that is necessary for your program.

Error trapping is important, and the powerful facilities available in BASIC V leave no excuse for non-implementation. However it should **not** be used to allow lazy and sloppy programming, but should be used instead to make a program more user friendly, not, as pointed out in the above mentioned article, to irritate users. My personal preference is for a global "cover all" handler to prevent the program crashing, with occasional local error routines for specifics e.g. disc errors in the disc-handling part of a program.

To complete (at last, I think) BASIC V's error commands, v1.04 includes an ERROR EXT command used the same way as ERROR to generate an error, i.e.

ERROR EXT <error number>,<"error message">

The EXT refers to "external" and the error is reported, not by the BASIC error handler, but by the "caller's" error handler, which would usually be either the operating system (BASIC having been entered from the supervisor prompt) or the Wimp Manager (BASIC having been entered when a program is run from the desktop).

### Contributions

There have been very few contributions sent in to the BASIC forum recently. I do try to use the ones that are sent in, but a lot depends on how easy it is for anyone reading the article (and initially me) to understand how the routine works. (We're back on the documentation saga again!)

### A Non-WIMP Menu

This month's program is a front end menu for those of you who have not overcome the problems of using the wimp system. The program is straight forward and easily amended for specific applications. Danny Kilgariff's comments on the program are quite clear:

Line 60 determines the number of items in the menu.

Lines 120-200 defines the characters needed to draw box outlines. VDU23,x,... defines the bit pattern of character x.



Lines 220-330. This prints a box using the defined characters and confines text output to the box using a VDU 28 command to set a text window.

Line 410. These are the procedures called on selection, (those shown are dummies for demonstration). The ON <value> <statement>, <statement> is used but a CASE...ENDCASE construction could be used equally well. Note the double commas between items as n% is a multiple of two.

Line 450 This is the data for the menu items. Note the "" between items as only alternative positions are used here.

Lines 1040-1080 Disable cursor keys and returns ASCII values of the keys when pressed as y%.

Lines 470-820 PROCc prints the name centrally in the window in white. PROCb overprints the chosen item in red. When the cursor keys are pressed, n% is incremented or decremented depending on the key pressed, but will not be set to a value above the menu or below the bottom item. When the word 'RETURN' is passed, n% is passed to the procedure's selection process. Note the use of VDU 11 to move up one line and VDU 10 to move down a line when positioning the cursor for printing.

```

10 REM >BASIC_MENU
20 REM Danny Kilgariff JAN 89
30 MODE 12
40 COLOUR 0,4
50 COLOUR 128
60 items%=5
70 DIM t$(items%*2)
80 PROCchar_box
90 PROCmenu
100 END
110 :
120 DEF PROCchar_box
130 VDU 23,150,255,0,0,255,0,0,0,0
140 VDU 23,151,0,0,0,0,255,0,0,255
150 VDU 23,152,36,36,36,36,36,36,36,36
    ,36
160 VDU 23,153,63,32,32,39,36,36,36
    ,36
170 VDU 23,154,252,4,4,228,36,36,36
    ,36
180 VDU 23,155,36,36,36,36,39,32,32
    ,63

```

```

190 VDU 23,156,36,36,36,36,228,4,4
    ,252
200 ENDPROC
210 :
220 DEF PROCbox(a%,b%,c%,d%)
230 LOCAL e%,f%,i%
240 e%=(b%-1)-(d%+1)
250 f%=(c%-1)-(a%+1)
260 VDU 28,a%,b%,c%,d%
270 PRINT CHR$(153)+STRING$(f%,
    CHR$(150))+CHR$(154)
280 FOR i%= 1 TO e%
290   PRINT CHR$(152);SPC(f%);
    CHR$(152)
300 NEXT i%
310 PRINT CHR$(155)+STRING$(f%,
    CHR$(151))+CHR$(156)
320 VDU 28,a%+1,b%-2,c%-2,d%+1
330 ENDPROC
340 :
350 DEF PROCmenu
360 CLS
370 PROCheadbox
380 PROCbox(24,28,56,8)
390 VDU 23,0,10,32|
400 n%=FNselect
410 ON n% PROCitem1,,PROCitem2,,
    PROCitem3,,PROCitem4,,PROCfinish
420 ENDPROC
430 :
440 DATA "MENU DEMO"
450 DATA "", "Item 1", "", "Item 2",
    "", "Item 3", "", "Item 4",
    "", "Finish", ""
460 :
470 DEF FNselect
480 CLS
490 COLOUR 3
500 PRINTTAB(2,12)"Use up and down
    cursor keys"
    510 PRINTTAB(8,13)"to select
        option"
520 PRINTTAB(4,15)"Press RETURN to
    execute"
530 COLOUR 7
540 RESTORE 450
550 FOR i%=0 TO (items%*2-1)
560   READ t$(i%)
570 NEXT i%
580 PRINTTAB(0,0):VDU11

```

```

590 FOR n%=0 TO items%*2-1
600   PROCc
610   VDU 10
620 NEXT n%
630 n%=1
640 PRINTTAB(0,1):VDU 11
650 PROCb
660 REPEAT
670   y%=FNcur
680   IF y%=139 AND n%>1 THEN
690     PROCc
700     VDU11:VDU11
710     n%-=2
720     PROCb
730   ENDIF
740   IF y%=138 AND n%<(items%
                                *2-1) THEN
750     PROCc
760     VDU 10:VDU 10
770     n%+=2
780     PROCb
790   ENDIF
800 UNTIL y%=13
810 VDU 23,0,10,107|
820 =n%
830 :
840 DEF PROCb
850 COLOUR 1
860 PRINT SPC((28-LEN(t$(n%)))/2);
                                t$(n%)
870 COLOUR 7
880 VDU 11
890 ENDPROC
900 :
910 DEF PROCc
920 PRINT SPC((28-LEN(t$(n%)))/2);
                                t$(n%)
930 VDU 11
940 ENDPROC
950 :
960 DEF PROCheadbox
970 PROCbox(20,6,60,2)
980 RESTORE 440
990 READ head$
1000 PRINT SPC((38-LEN(head$))/2);
                                head$
1010 VDU 26
1020 ENDPROC
1030 :
1040 DEF FNcur
1050 *FX 15,1
1060 *FX 4,1
1070 y%=GET
1080 =y%
1090 :
1100 DEF PROCitem1
1110 VDU 26
1120 CLS
1130 FOR i%=1 TO 500:PRINT"Item 1 "
                                ;:NEXT
1140 dummy=INKEY(250)
1150 PROCmenu
1160 ENDPROC
1170 :
1180 DEF PROCitem2
1190 VDU 26
1200 CLS
1210 FOR i%=1 TO 500:PRINT"Item 2 "
                                ;:NEXT
1220 dummy=INKEY(250)
1230 PROCmenu
1240 ENDPROC
1250 :
1260 DEF PROCitem3
1270 VDU 26
1280 CLS
1290 FOR i%=1 TO 500:PRINT"Item 3 "
                                ;:NEXT
1300 dummy=INKEY(250)
1310 PROCmenu
1320 ENDPROC
1330 :
1340 DEF PROCitem4
1350 VDU 26
1360 CLS
1370 FOR i%=1 TO 500:PRINT"Item 4 "
                                ;:NEXT
1380 dummy=INKEY(250)
1390 PROCmenu
1400 ENDPROC
1410 :
1420 DEF PROCfinish
1430 CLS
1440 PRINTTAB(0,items%) "   Good Bye"
1450 dummy=INKEY(200)
1460 CLOSE# 0
1470 VDU 26
1480 CLS
1490 END
1500 ENDPROC A

```



# Wingpass' Macro Assembler

## Tom Crane

An assembler is a program which reads and converts an assembly language program, as typed in by a user, to machine code. In an assembly language program there is a one-to-one correspondence between the statements in the source code and the machine instructions that make up the machine code output. This is in stark contrast to a high level language (e.g. C) where a statement may produce hundreds of machine instructions.

It is important to understand this difference since the subject of this review, the Macro Assembler by Wingpass Computer Services is unusual in that it processes C header files as well as Assembly language. It is, however, an assembler not a compiler. Some Archimedes assemblers such as the built-in BASIC one and Acorn's AASM produce code which is directly executable whereas others like this one and Acorn's OBJASM, produce an intermediate sort of output known as Object Code which requires the attentions of a program called a linker to produce the executable code.

There are two main advantages in doing things this way. Firstly, a big program can be developed and tested in bits. Secondly, chunks (called 'modules') of program written in other languages like 'C' can be incorporated into the final program since the output of the 'C' compiler is also in object code format.

By way of example, supposing you were going to write a program such as comms package which would, say, need to do complicated things like emulating a sophisticated terminal in the windowing environment as well as drive some hardware device such as a serial port or Ethernet card. Obviously writing the terminal emulator in assembler would be a bit of a pain - this is an ideal task for doing in a high level language like C. The low level driver has got to be really fast, so this would be done in assembler where you can design the code for maximum performance. When the C program needs to read/write the hardware it calls a function in the normal C way. The difference is that the function is written in assembler not C. To be able to be used with the C code, the assembly language

program has to obey a set of rules laid down by Acorn called the "ARM Procedure Calling Standard".

## Review

In this review I'll attempt to keep a comparison going between this assembler and Acorn's OBJASM since the two are roughly competing software packages.

If you are a C programmer, you will quickly find yourself at home with this assembler since it uses C syntax for expression evaluation in most things instead of defining its own as the Acorn one does. For example, a hex constant would be 0x7F and a string constant terminated by <BEL> and <newline>, "Hi there\n". I found the general program format bold and easily understandable. In syntax and general appearance, it strongly resembles VAX MACRO. This is well illustrated by the assembler directives for data initialisation and space reservation. The following program fragments show some of these things for this assembler and OBJASM. First the OBJASM:

```
DCD &12345678 ; Embed 32 bit no. in memory
DCB 0,1,2 ; Embed some bytes in memory
DCB "Help!" ; Embed a string in memory
% 84 ; Reserve 84 bytes of storage
DCFD 4.2 ; Embed 4.2 in memory as a 'double'
```

Now the Wingpass;

```
.LONG 0x12345678 ; Embed 32 bit no. in
memory
.BYTE 0,1,2 ; Embed some bytes in memory
.ASCII "Help!" ; Embed a string in memory
.BLKB 84 ; Reserve 84 bytes of storage
.DFLOAT 4.2 ; Embed 4.2 in memory as a
'double'
```

## C Header Files

The really unusual feature of this assembler is its ability to process C header files. It only understands a selected subset of C and the documentation warns the user to run header files through the ANSI C compiler first since the assembler does not cope with C errors in a user-friendly way when it finds things it does not like. Some of the C things that it

understands are extern statements, function prototypes, the 'sizeof' operator, structure, union and enum definitions.

Why, you might ask, is this a useful thing to be able to do? Well, going back to my previous comms program example, suppose the I/O done to the hardware is in the form of 'packets'. Let each packet contain a 'header' field and a 'data' field. The data field contains the raw information being sent/received and the header field itself consists of several subfields which hold small pieces of data representing, say, the length of the data in the data field, the ID of the sender (in a multi-computer network), the time the packet was sent etc. Obviously the way to handle this information in a C program is with a structure. Let us suppose the C program wants to send one of these packets to the device driver. It does this by calling a function which passes the structure holding the information to the assembly language driver. This is where the features of the assembler are used. The structure definitions are made available to the assembler via a C header file. The assembly language programmer then has easy access to the parts of the structure using the following directives. ".OFFSET" provides the offset of a particular element within a structure. ".MASK" and ".BITNO" are used on bit fields within structures.

Like the Acorn one, this assembler has a powerful macro facility and handles the floating point instruction set. OBJASM has some very powerful features for handling 'literals' which don't have equivalents in the Wingpass. Literals are data which is embedded in the program for use with PC relative addressing. They can be used when it is impossible to use an immediate mode instruction like MOV due to the data being out of range of the operand.

### The Package

The assembler comprises a 72 page A5 size instruction book and a 3.5" disk. The book is clearly presented with plenty of examples. It includes a section on the elements of the procedure calling standard as required for interfacing with C and appendices summarising the ARM and floating point instruction sets. The procedure calling standard is a veritable maze for the uninitiated but all the information that is needed for writing

assembler functions which can call and be called from C is clearly described. I found one small mistake in this section.


### Example Programs

Three example programs are provided on the disk. One plots Mandelbrots in mode 13, one implements unsigned division as a relocatable module and is used via a SWI call by the third program. The third program also contains a C program. It calculates and prints the prime factors of a number.

I found I was unable to RMLoad the example relocatable module. It seems that the author of this example program has made a flawed assumption about the format of the linker output files. These files are in AIF format (Acorn Image Format), so the first four words which were supposed to be offsets to the relocatable module's start, initialisation, finalisation and service entry handlers were dummy branch (BLNV) instructions. These are put in by the linker (or at least the version I am using does) as placeholders for BL instructions which would have been used to execute the decompression code, self relocation code etc. had the language run time library required it.

The fact that the linker does this could be a problem for someone trying to produce 'pure' code e.g. for relocatable modules. This is probably part of the reason Acorn produced AASM as well as OBJASM. There are several possible solutions to this problem: A separate assembler like AASM, an assembler option to produce ready-to-execute ARM code and a special linker which does not add anything itself are a few. Anyway, as far as relocatable modules are concerned, Acorn is supposed to be providing support for producing them with C in a new release of C+linker some time in the future.

### Conclusion

I found the general program layout easy to understand. C programmers certainly should appreciate being able to use a familiar syntax. Of course, the only way to find the wrinkles in a piece of software like this is to do lots of programming with it – something which time does not allow me to do. However, I think from what I have seen of it that this is an excellent product and I would recommend it. (£49.95 inclusive from Wingpass Ltd ) 



# Ancestry – Genealogical Database

## Norman Kirkby

Ancestry is a special-purpose database for genealogical records. You can enter, store, retrieve, edit and present information about a family, delete and add people in any order and link them (as child or spouse) to others. Information can be printed out in several forms, including the traditional tree.

## Facts

One Mbyte of RAM is needed, giving over 3000 records or 1000 if you have a User File (see below). You can get away with using one disc drive but two are better. With 4 Mbytes and a hard disc, over 10,000 records can be stored.

## Use

The basic data on each person is entered in card format: surname, forename, nickname, gender (sex), status (dead or not), title, date and place of birth and death. Most can be left blank. More information, e.g. anecdotes, occupation and even a picture if you have access to a digitiser, can be stored in a supplementary User File which is also displayable, although you cannot search on it. Then in another screen, via a menu, people are linked together—spouse first, then children—by specifying their card numbers, date of marriage etc.

Having set up the database, which is straightforward but time-consuming if you have a large family, you can edit it easily. Entries are extensively validated when entered.

## Display modes

In addition to the card display, there is a tree display which shows the names and dates of the current person in a box 3 x 2 inches in the centre of the screen with a similar display for his/her parents and children, the children's boxes being overlaid on but slightly offset from each other. A mouse-click on any of these people's boxes makes that person current and a mouse-click on the current box toggles between tree and card mode of display very attractively and conveniently. In both modes you can search for a card number or surname, forename or nickname, or scroll through cards or go directly to the first or last.

## Reports

Reports can be generated to screen, printer or disc essentially in tabular form. For these, subsets of people can be created using complex criteria such as `SS="PLODD" AND SX$="F" AND YB>1850`, i.e. "All females with surname PLODD born after 1850" or you can simply report on all ancestors or descendants of a person. If you know BASIC, any criterion that can be understood by the EVAL command can be used. E.g. `INSTR(SS,"MAC")=1 AND A>60` would give all people with surname beginning with MAC aged over 60. The subset can be sorted on any field (e.g. by dob, surname, marriage date and by age. However, I found that a person whose death date is unknown is given an age as though he is still alive, despite an "X" in his card meaning "dead".

A conventional tree layout can be printed, i.e. with boxes and horizontal and vertical lines connecting names, showing full name, card number, birth, death and marriage dates of all descendants (N.B. descendants only) and their spouses. You specify the card number of the head person and the number of generations. From 5 to 21 generations can fit (sideways on the paper) depending on size of print, which you can choose. The width depends on the maximum number of children and spouses in any generation and can be huge. I found the wide spaces between spouses rather inappropriate. To check whether you like it, you could ask to see an example at a dealer or exhibition.

A help screen is readily available throughout. Copy protection means that you must insert the original disc when starting, or printing a tree.

## Documentation

The manual is excellent. A5, 56 pages, nicely printed, very well written. It has a tutorial section, using the Royal Family database provided, which covers the basic operations and it has a good index.

## Value

Only you can decide whether a computer could help you. You could ask questions like: Have I more than, say, 100 people? / Is the tree still changing as

more data and people are discovered? / Do I want to manipulate data (e.g. extract all female descendants of Fred Plodd or all people who died younger than 20 between 1850 and 1950)? / Do I lack a word processor to type it out manually? / Am I a computer enthusiast? If the answer to several of these is "yes" then you will like "Ancestry". It is comprehensive, competent and easy and sensible in use. A good piece of software.

### Niggles?

I have just two niggles. Firstly, you cannot see what files are available at the instant of saving or loading, although you can catalogue the disc elsewhere at some inconvenience. Secondly, it would have been

nice if the conventional tree printout could have included the siblings and ancestors of spouses up to the generation of the head person, thus allowing a complete tree to be printed, but I accept that it would have been difficult to program.

### Verdict

It seems quite good value for money and so, if you want computer help for this purpose and you have £70 to spend, then you should buy it but check the competition first.

"Ancestry", by Minerva Systems, £79.95 inc. VAT. (£70 from Archive.) Works with RISC-OS and Arthur. This software is copy protected. **A**

## Graphics Utilities

### Richard Averill

One could say that the Archimedes has the best graphical capabilities of any microcomputer. One would be right, though somebody would argue with you! Through the custom-designed VIDC (video controller) chip, forming part of the ARM chip set, the Archimedes has one of the most advanced screen displays of any microcomputer. But, even more importantly, the Archimedes' screen display is much more simple than any other, due to the whole ARM 'RISC' ethos.

This simplicity allows, say, a BASIC program to perform quite astonishing acts with a bit of assembly code and a few calls to the operating system. In this article, I present a few interesting utilities that I have developed.

### Graphics in mode 16?

The new RISC-OS allows graphics in mode 16. However, Arthur 1.2 does not and, even with RISC-OS, mode 12 screen files cannot be loaded into mode 16. Mode 16 is a 16 colour mode with 1056 x 256 resolution (yes, 1056!) As this is similar in all respects to mode 12 (16 colours with 640 x 256 resolution), how about loading a mode 12 screen into mode 16 and benefitting from the higher resolution? It can be done!

The program presented here will do just that: a screen saved with \*Screensave or \*Fastsave (which is a faster screen save provided by Clare's FastRM

module: see Archive 2.6 p 19 for a listing of it and 1.7 p 5 and 1.10 p 6 for up-dates.) can be loaded by the program. A horizontal pixel offset is asked for. This is the gap on the left of the screen into which the screen will not be loaded.

A demonstration screen of the latest version of my Arc-DFS utilities is provided on the monthly disc. This can be loaded by the "LoadWide" utility by giving the name "dfsreader1" when asked for a filename.

### How the routine is called

The most important part of the utility is the procedure, PROCloadwide. This is called with five parameters, as follows:

PROCloadwide(name of screen file to be loaded, gap (in pixels) to leave on left of screen, fairly small buffer pointer (about 1k), length of this buffer, pointer to buffer of at least 81k length)

The buffers would normally be allocated using the DIM<variable name><buffer length> command in BASIC, for example, DIM buffer% 1000.

### Flow description

The program should be fairly self-documenting due to the use of long, meaningful variable names. Firstly, the sprite control block of the screen file is loaded and the screen mode and palette data are set up if required. The screen start address is then obtained using legal operating system calls (A440



owners please note!) and a fast transfer code is assembled. If the screen is at least 1 pixel in size(!), then the mode 12 screen is loaded into the buffer and copied to the main screen using the machine code program.

The machine code transfer routine is used to load the screen in at fastload speeds, rather than the \*Screenload (OS1.2) speed which was originally obtained by loading the picture line-by-line into screen memory!

Note the use of the OS\_GBPB routine to load from a specified position in a file, and also the OPENIN(file\$) that is used to allocate a filing system handle to the screen file, and also the CLOSE#file\_handle% that is used to close the file!

### Yes, but why?

It may seem a bit idiosyncratic, but I feel that this utility has a real use for some applications. Take, for example, adventures using graphics. If mode 16 was used instead of mode 12, more could be fitted on the screen with graphics: for example, text on the right hand of the screen, graphics on the left (or vice-versa). And remember that the mode 12 screen does not have to be 640 pixels in width. It can in fact be any width.

The extra horizontal resolution in some way makes up for the lack of decent vertical resolution, but does not match up to the resolution in mode 20 standards. (Just a quick plug for Multisync monitors.) Buy one – they are well worth the extra money for all the advantages: higher dot-pitch, modes 18/19/20, better colours (well, usually!), no high-pitched squeals (probably due to radiation emitted by the monitors when running in standard modes coming slightly in the acoustic band), the ability to cook fried eggs on the ventilation slots of a multisync monitor, the doubling of the number of text rows that can be displayed (64 instead of 32) being much more suitable for use with wordprocessors, etc, and of course the sheer status symbol that the ownership of a multisync monitor represents! (*Well, I haven't got one! Ed.*)

```
10 REM > LoadWide
30 REM (C) Richard Averill, March 89
50 REM Loads mode 12 (640x256x16)
   sprites into mode 16 (1056x256x16)
```

```
70 REM To speed up operations, a
   temporary buffer is used : 81k.
90 DIM buffer% 1000, temp% 81*1024
110 mode%=MODE
120 REPEAT
130   IF mode%<18 THEN MODE 0 ELSE
       MODE 18
140   PRINT '"Load-Wide BASIC V
       procedure (load mode 12 into
       mode 16)"
150   PRINT '" ) Richard Anthony
       Averill, 1988."'
160   PRINT "Demonstration screens of
       the new Arc-DFS reader : '"
       ""df sreader1"" (mode 12)""
170   INPUT "Filename: "file_name$
180   INPUT "x offset: " offset_x%
190   offset_x%=offset_x% DIV 2
200   PROCloadwide(file_name$,
       offset_x%,buffer%,950,temp%)
210   SYS "OS_Byte",21,0
220   IF GET : ENDIF
230 UNTIL FALSE
240
260 REM Basic V LoadWide
270 REM (C) Richard Averill, March 89
280 REM This is a library procedure
       which you can use in your
       own prog rams.
310 DEF PROCloadwide(file_name$,
       _offset_x%,
       temporary_buffer%,temporary_
       length%,image_buffer%)
320 LOCAL file_handle%,sprite_start%
       ,image_start%
340 IF offset_x%>=160 THEN offset_x%
       =160
360 file_handle%=OPENIN(file_name$)
370 SYS "OS_GBPB",3,file_handle%,
       temporary_buffer%,
       temporary_length%,0
390 sprite_start%=(temporary_buffer%
       !4)+temporary_buffer%-4
400 image_start%=sprite_start%
       +(sprite_start%!32)
420 current_mode%=MODE
430 IF current_mode%<>16 THEN MODE 16
440
450 IF image_start%>sprite_start%+44
       THEN
460 FOR colour%=0 TO 15
470   rgb_address%=(colour%*8)+1
       +sprite_start%+44
```

```

480 COLOUR colour%,rgb_address%?0,
      rgb_address%?1,rgb_address%?2
490 NEXT
500 ENDIF
520 length_x%=((sprite_start%16)+1)*4
530 length_y%=sprite_start%120
550 !temporary_buffer%=149
560 temporary_buffer%!4=-1
570 SYS "OS_ReadVduVariables",
      temporary_buffer%,
      temporary_buffer%+40
580 screen_start%=temporary_buffer%40
590
600 FOR opt%=0 TO 2 STEP 2
610   P%=temporary_buffer%
620   [ opt opt%
640   ; r0 = pointer to start of image
650   ; r1 = address of screen +
      x offset
660   ; r2 = pointer to end of image
670   ; r3 = length in bytes of one
      graphics line
690   mov r12, r3
710   .line_loop%
720   add r3, r12, r0
740   .blit_loop%
750   ldmia r0!, {r4-r11} ; fast
      8x32-bit data transfer
760   stmia r1!, {r4-r11}
770   cmp r0, r3
780   blt blit_loop%
800   add r1, r1, #208
810   cmp r0, r2
820   blt line_loop%
840   mov pc, r14
850   ]
860 NEXT opt%
870
880 IF length_x%>0 AND length_y%>0
      THEN
890 SYS "OS_GBPB",3,file_handle%,
      image_buffer%,length_x%*
      (length_y%+ 1),image_start%
      - temporary_buffer%
900
910 REM registers to be passed to
      above m/c routine (A%=r0,
      B%=r1 etc.)
920 A%=image_buffer%
930 B%=screen_start%+offset_x%
940 C%=image_buffer%+(length_x%*
      (length_y%+1))
950 D%=length_x%
960 CALL temporary_buffer%

```

```

970 ENDIF
980 CLOSE# file_handle%
990 ENDPROC

```

### Multisync without Multisync?

A number of people have asked about how a 640x512 resolution can be obtained using a normal, non-multisync, monitor. CJE Micro's do a public domain disc which loads pictures from a disc and displays them. However, this is cheating! The pictures are not standard mode 20 screen files; they consist of half-screens which are loaded into two screen banks.

The utility listed here will display a mode 20 screen file using interlaced mode 12 (interlacing is controlled by the program), working on a standard monitor or a multisync monitor. The method used is to load the screen file into a 161k buffer (as mode 20 screen files are about 161k in length), select mode 12 with two screen banks (so Screensize must be set at 20, or 0 on an A310) and to copy one half of the picture into each screen bank. Then, the picture is displayed with the displayed screen bank swapped (or toggled) after each display cycle.

The method used is quite simple, although ARM assembly language has been used to copy half of the screen into a screen bank, for sheer speed; in machine code, the transfer occurs almost instantaneously, but in BASIC the transfer takes quite a while.

The program is an interesting demonstration. However, 'real' emulation of a multisync monitor is quite difficult to achieve: for example, how to deal with vdu calls, etc. I gather that a utility exists to do just this, but in the end, anyone looking for a high resolution screen would be advised to actually buy a multisync monitor.

An example mode 20 screen is provided on the monthly program disc (a demonstration of the new Arc-DFS reader with on-line manual, plug, plug!) which can be displayed, as can all mode 20 screen files, though I suspect that the number of demonstrations in mode 20 are not that many! If you are lthink of buying a multisync monitor, take the monthly disc along to your Archimedes dealer and display the demonstration mode 20 screen: first with this emulation program, and secondly in 'real' mode 20, using the "FastLoad" program provided. Look at the difference in quality between the two



screens, and also the difference between the mode 12 screen ("dfsreader1") and the mode 20 screen. This should make the decision whether to upgrade to multisync or not, much easier!

```

10 REM > NoMode20
40 REM (C) Richard Averill, 1989.
60 REM Splits a mode 20 picture into
   two bits for displaying in mode 12.
80 MODE 0
100 PRINT "Mode 20 display on
        standard resolution
        colour monitors!"
110 PRINT "(C) Richard Averill, 26
        Feb 1989."
111 PRINT "In case of mis-alignment,
        press <space> to re-generate
        screen display."

120
130 DIM shift_half_screen% 128
150 FOR opt%=0 TO 2 STEP 2
160   P%=shift_half_screen%
170   [ opt opt%
180   .loop1%
190   mov r3, r0
200   add r4, r3, #316
210   .loop2%
220   ldmbia r3!, {r5-r8}
230   stmbia r2!, {r5-r8}
240   cmp r3, r4
250   blt loop2%
260   add r0, r0, #640
270   cmp r0, r1
280   ble loop1%
290   mov pc, r14
300 ]
310 NEXT opt%
320
321 PRINT "screen files: """"
        dfsreader2"" (mode 20)""
330 INPUT "Mode 20 screen to display
        in interlaced mode 12 : " source$
340 PRINT "'Loading source picture
        ..."

350
360 DIM source% 162*1024,scrnvars% 128
370 SYS "OS_File",255,source$,
        source%,0
390 first%=(source%!4)+source%-4
400 image%=(first%!32)+first%
420 PRINT "Start of image = &";
        ~source%
440 REPEAT
450   WAIT

```

```

460 *SHADOW 2
470 SYS "OS_Byte",&90,0,0
480 TIME=0:MODE 140:OFF
500 IF image%>first%+44 THEN
510   cnt%=first%+44
520   FOR col%=0 TO 15
530     COLOUR col%,cnt%?1,cnt%?2
        ,cnt%?3
540     cnt%+=8
550   NEXT
560   ENDIF
570
580 SYS "OS_Byte",112,1
590 bank1%=FNvduvar(148)
610 A%=image%
620 B%=image%+163200
630 C%=bank1%
640 CALL shift_half_screen%
660 SYS "OS_Byte",112,2
670 bank2%=FNvduvar(148)
690 A%=image%+320
700 B%=image%+163520
710 C%=bank2%
720 CALL shift_half_screen%
740 ON ERROR SYS "OS_Byte",&90,0,1:
        MODE MODE:PRINT REPORT$;
        " at line ";ERL:END

760 bank%=((TIME DIV 2)MOD2)+1
770 REPEAT
780   WAIT
790   SYS 6,113,3-bank%
800   WAIT
810   SYS 6,113,bank%
820   UNTIL INKEY=99
830   SYS "OS_Byte",21,0
840 UNTIL FALSE
860 END
870
880 DEF FNvduvar(var%)
890 !scrnvars%=var%
900 scrnvars%!4=-1
910 SYS "OS_ReadVduVariables",
        scrnvars%,scrnvars%+64
920 =scrnvars%!6

```

(We have looked once or twice at the possibility of doing a deal on multisync monitors for Archive readers, but it's such a cut-throat market that unless we get something which is obviously a good deal, we probably won't bother. However, we are going to borrow one of the new NEC Multisync 3-D's to see what they are like and if we manage to get a good deal, we'll put the information up on Eureka's I and II. Ed.) **A**

# Digi-Sim – Digital Logic Simulator

## Alan Barclay & Brian Cowan

*"Digi-Sim is a real-time logic simulator....intended for use both within education and as a design and development aid." So says the blurb on the title page of the manual. In this review we have Alan Barclay looking at it for the design side and Brian Cowan, who is a university lecturer, looking at it from an education point-of-view.*

As a second year electronic engineering student, I spend about three hours a week sitting in front of Apollo Domain 3000 work stations using electronic circuit simulators. These machines are 68020 based with 4 Mbyte of memory and 15", 4096 colour monitors. The packages which are available to us include Schematic Capture, Digital Logic Simulator and Waveform Analysis programs from the Silvar-Lisco suite of software which costs around £20,000. We also have SPICE, the standard FORTRAN analogue circuit simulator as well as packages for producing silicon (gate aArray) chips directly from schematic drawings.

We use the facilities primarily for project work, but we are also encouraged to run our tutorial questions through one of the simulators to check our solutions and also to prepare for life in industry where tools such as these are commonplace.

As such, when I heard of Digi-Sim for the Archimedes I had to try it out.

### Introduction

The purpose of Digi-Sim is to allow people to design digital logic circuits and test them before committing the circuit to Veroboard. Since it also serves as a logic teaching system, it will allow those of you who have never considered building logic circuit to get a lot of easy practice without all the hassle of power supplies, wire links, faulty IC's and hot soldering irons.

Computer simulators are used to test electronic circuits for many reasons. One of these is that prototype development and fault diagnosis can be expensive and time consuming. Also, when a circuit is drawn on a computer system one can be assured that there are no faulty components or bad soldering joints! Thus if the circuit doesn't work then it has to be a design fault.

Have you ever written a long program (or even a short one) which worked perfectly first time around? The answer is probably not, but this doesn't matter because you can easily edit the code and try again. When an

electronic circuit (or chip) is designed and fabricated on a circuit board (or in silicon) it is very difficult or even impossible to change the design if an error is found. It would have been very expensive to develop a complicated silicon chip like the ARM microprocessor or the Archimedes circuit board by trial and error, i.e. build it, test it, correct the design errors, build it again, etc with the process being repeated until a fully working version was made. When Acorn put the design of the ARM to VLSI for manufacture they knew that the design was perfect and that it would work first time. The reason they were so sure is because they had the design simulated and debugged before a single silicon wafer was cut.

### Schematic capture

In order for the computer to be able to simulate a circuit, it must be told what the design looks like and this is done by 'schematic capture' which is essentially a CAD system for electronics. The circuit components appear as icons in a library which can be placed on the worksheet and connected together. Schematic capture normally includes facilities for; copying, deleting, moving or rotating components and areas; placing text and building modules. A module is small logic circuit (e.g. a half adder) which is placed inside a 'black box' where its logic components are hidden. All that is then shown is a logic circuit element displayed as a rectangle with only the circuit inputs and outputs visible.

Digital electronics basically is the name for design which uses electric circuit components (gates) which produce output conditions with only two states; on or off. That is, all the information is in a binary form. In the case of the standard TTL family of digital integrated circuits (as used in the majority of computers) these conditions apply to 0 volts and 5 volts whereas CMOS devices can work from 3 volts up to about 18 volts. The basic digital gates are NOT, AND, OR and Exclusive OR as well as NOT AND (NAND) and NOT OR (NOR), either of which can be used in various combinations to emulate any other gate. Other common digital components include; encoder/decoders, latches, flip-flops, adders (addition circuits), multi/demultiplexers, counters, microprocessors, RAM and ROM, etc.

### The Digi-Sim package

The disk arrived with a matching orange plastic-covered manual which contains information on how to run the program under both Arthur and RISC OS and also explains the conditions of the user licence, although there was no information about installation on hard disk.



The disk is thankfully not copy protected and is supplied with a white pre-printed Digi-Sim Backup label which is a very good idea, others software producers please note. There were no problems or surprises getting the software started (which proceeds to load quite swiftly) and the manual provides a good 'First Steps' section on how to spend your first few minutes with the simulator.

There are several quite interesting example circuits provided on the disk but they have been created a bit haphazardly with crossing wires and components which are all unaligned, a problem to which I will return later.

## Documentation

The 70 page laser printed manual contains neither index nor contents list, which makes finding anything a long process. It does describe the Menu, Options and Circuit Elements in great detail and there is also a section with Hints for newcomers and Notes on the supplied example circuits. The rest of the manual (47 pages) serves as an Introduction to Logic, with sections on Logic Gates, Karnaugh Maps, Multiplexers, Read Only Memory, Sequential Logic (Flip-Flops), Counters and Shift Registers. At the end of each chapter there are several project circuits to design and try for yourself. While this doesn't contain all the information one might want to know about logic, it does provide a reasonable background and there is a bibliography at the back of the manual.

If you think that just because a manual is laser printed, it must look good, you will be in for a shock. It appears that the typesetter here couldn't make up his mind about how many lines to leave between paragraphs and the proportionally spaced typeface is quite tiring to read even though my eyesight is perfect. There are large blocks of text crammed together with tables and circuits, making it difficult to follow sentences. Also, all of the titles, headings and annotations are exactly the same size and weight as the rest of the text which means they don't stand out. The use of capitals and underlining just makes it worse. When I compared this manual with that of Watford's Video Digitiser which uses bold and light text and different fonts for titles, etc. I could hardly believe the total contrast in quality between these two manuals.

## In use

After loading has completed you are presented with a menu of the available components down the left hand side of the screen and an options bar along the top. The option bar includes Simulate on/off, Wires on/off, Build /Alter, the current filename and board scrolling arrows.

A schematic is created by picking components from the rack using the mouse and dropping them on the board. The board is larger than the screen and can be scrolled to

provide space for more components. The components are connected together by clicking on the input or output of the first component (the pointer indicates a connection point by changing into a soldering iron!) and then moving to the input or output of the other component. While a connection is being made the pointer turns into a roll of wire. Connections can only be made at components and not in the middle of a wire and it will correctly not allow two outputs to be connected together. Unfortunately the soldering iron/wire cutters/roll of wire pointers while may appear to be a good idea are let down by the poor design of these icons and a lot of imagination is required to work out what the tool really is.

## Making connections

In Digi-Sim when you join components together, the wires are placed automatically and you have no control over where they lie. This has the advantage that you don't need to spend time routing the wire, but it does mean that wires often cover components and obscure other wires since they tend to follow the same paths when components are placed vertically above each other. The wires can also be corrupted by clocks and labels which tends to remove the usefulness of the coloured wires.

This problem is made worse by the fact that components are always placed with inputs to the left and the outputs to the right (rotation is not possible) and each connection always moves about half an inch away from the component before it alters direction. This limits the distance that two gates can be placed apart and the neatness of connections which come from the output of a gate back to an input of the same device.

## Simulation

When the schematic is completed, it can be simulated, that is, clocks will produce pulses, counters will count, LEDs will indicate the level of their inputs, etc. When a switch is altered, the action is seen to take effect immediately (or at least after a slight propagation delay while its effect moves through all the logic elements). The Wires option allows the connections to be coloured, red and blue as opposed to a neutral colour, to illustrate their current level. However this slows the simulation down considerably because many wires can be changing continuously and so this can be switched off to speed things up again.

## Realtime or waveform simulation?

Digi-Sim is a real time simulator and is in contrast to other simulators (such as Helix in the Silvar-Lisco suite) which do not simulate in real time. Instead they are given a set of input stimuli i.e. a list of the input conditions

(clock frequencies, switch times, etc.) over a time scale and will produce a series of output waveforms for analysis and comparison with the input conditions.

These two systems are quite different in operation and are suitable for different tasks. The Digi-Sim system is far more useful for small logic circuits and logic teaching firstly because it is very easy to use and secondly because changes in the inputs are shown immediately by changes on the outputs and so you can see exactly what effect a certain gate has on the output. Waveform simulators are better for complex circuits with large numbers of inputs and outputs or where exact timing waveforms are required.

### Windows

The windows used in Digi-Sim for the menu, file selection, etc. are not done in the standard Acorn WIMP design and while they operate in a similar fashion, it is frustrating if you use several applications all of which use a different style of windows. I'm sure that this adds considerably to the problems for less experienced users. Why, if Acorn provide an adequate WIMP system, do software houses need to invent their own? (*Because Arthurian WIMPs are such a pain to program? Ed.*)

### Labels

Schematics can be annotated by text labels which are quite adequate including labels for inverted outputs which can be 'overlined', i.e. be written with a line over the top to indicate negative logic. (0 = true, 1 = false) These can be repositioned quickly, as can all of the components. The board scroll is also reasonable except when there are lots of gates to be moved because everything is always redrawn whenever anything is moved or placed.

### Facilities

The system provides the following circuit elements; Buffers, NOT, AND (2 and 3 input), NAND, OR, NOR and EOR gates; Red, Yellow and Green LEDs; a seven segment (Hex digit) display; a couple of switches; a Clock; an Edge Triggered D Type Flip-Flop and Labels. There is a maximum of 200 items per schematic but Musbury says that they will extend this on request and return of the disk.

The range of components provided is slightly limiting. For example, there are no multiplexors or JK flip-flops (Not everybody wants to toggle D Types). While these can be constructed from individual gates, the schematic very quickly becomes cluttered and the logic cannot easily be seen because of badly placed wires. Also, the lack of facilities to build module functions is sorely missed. The components themselves are quite bulky and

take up a lot of room on the screen which itself is poorly laid out, with both the side and the top devoted to menus. It is also disappointing that this software does not take advantage of the 640 by 512 resolution modes of Arthur or RISC OS.

The package does provide means of dumping the circuit to a printer but no dump routines are provided and there is no facility to get a plot of the circuit or a hardcopy of input/output waveforms so that conditions can be compared.

### Conclusion

This product is aimed at GCSE to undergraduate level. At secondary educational establishments it will function very adequately as a digital logic design tool since pupils can learn about digital logic by constructing their circuits and testing their designs without the need for chips, PSUs and prototype boards.

However, I do not think that it has enough features to be of real use to electronics students. In particular, circuit layout due to the automatic wires is very poor. Glitch detection is impossible – a glitch is when an output changes state during the transition of an input but returns to its original state after the transition has occurred. The lack of a plotter driver to produce timing waveforms means that there is no means of submitting information to your lecturer to prove that the circuit design works. Also, a printer hard copy of the circuit output would not be of good enough quality for inclusion in a report.

The manual does contain quite a reasonable amount of relevant information for those inexperienced with digital logic but it must be printed with a better layout and an index.

Digi-Sim costs £45 for a single user (£40 through Archive) and £135 for a network licence. Overall, if you want to learn about digital logic, this package will certainly teach you to do so for not a lot of money and for educational establishments, the network user price is very good value for money.

### Brian Cowan's comments...

I shall look at Digi-Sim from the opposite point of view. Alan has told you what a student might think about the product, and I will now give a teacher/lecturer's impression. However, I should point out that I have not had the opportunity to try out the very sophisticated and expensive logic simulator systems that Alan has.

Digi-Sim can run under RISC OS and when you use it that way it can be started from the desk top. Booting up is quite straightforward and you can get a long way without studying the manual. This is good because you



can get started immediately. Nevertheless, the manual gives a good introduction to digital circuitry.

As you will have gathered from Alan's review, the main use for Digi-Sim is as a teaching tool; it does not have the versatility required for more than simple practical circuits. I think the main strength will be in secondary school courses, where students will be able to get a long way using the manual and the references therein.

Also, parents wanting to teach their children about digital logic could find the package useful. Once you have shown them the basics, you can leave kids to find many things out for themselves.

Introductory courses at the higher education level could also benefit from using Digi-Sim, but it is important to appreciate the limitations of the package. For understanding how things such as latches, JK flip-flops etc. are made up out of elementary gates, Digi-Sim is superb. The colours of the lines changing with their logic level is particularly illuminating.

As an educational package, Digi-Sim represents good value for money. Although rather elementary for my final year undergraduates, it is ideal for schools. If Acorn were doing a bundled package of software for schools, then this would be an ideal constituent. **A**

## SYS and Other Special FX (Effects)

### Gerald Fitton

#### The story so far...

When I offered to produce this series of articles, Paul sent me a copy of a letter which included "Could we have a beginner's tutorial .... which explains how to get started with them (SYS)?" The writer congratulates the editor for the "up-to-date machine-specific" information which fills the magazine. Early Archimedes purchasers knew from the specification that it would be a good machine: now there are many who are buying it as their first computer. I hope that this series has something to offer both.

I have discussed the portability (to other computers) of programs written in standard high level languages (such as C) and said that BASIC V is less portable than the earlier versions (e.g. BASIC 2 or 4). One of my points was that portability must be compromised if the Archimedes is to become the market leader and market maker which it deserves to be. On the Archimedes, in order to do something more quickly, or something impossible in any other way, calls can be made directly to the RISC-OS (or Arthur) operating system with \* commands such as \*SGET (to create a sprite from the screen), with \*FX (effects) or by using SYS. These calls are machine specific and so they reduce the portability of programs using them.

A point which I should have made is that BASIC V on the Archimedes is the fastest and most powerful BASIC around. Some authors deride BASIC saying it is a language suitable only for beginners and that its use is limited to the simplest of programs. However, quite sophisticated programs can be written using BASIC V; this is because Acorn have ensured that all RISC-OS routines are easily available from within the BASIC environment. A mixture of well structured BASIC V and

calls to RISC-OS, with occasional ARM (machine) code, can be most effective.

#### Globals and parameters

In order to show how a program is gradually developed from almost pure BASIC with a few \* commands to a program liberally sprinkled with SYS calls, I have produced about half a dozen versions of the same program. Since each of these is between 2k and 3k long (and would take up about a page of Archive) it is really not possible to list them all, so they are available only on the monthly disc (or by sending an A4 s.a.c. to the Archive office.). The compromise is to include just enough in the magazine to illustrate the text of the article.

The first program, called Parameters, contains the following lines:

```
270 x%=3
1070 PROCdisplay(x%)
1100 PRINT "The global value of x%
      is still = "; x%
1140 END
10100 DEF PROCdisplay(parameter%)
10120 LOCAL x%,y%
10150 x%=7
10200 PRINT "The local value of x%
      is = "; x%
10220 PRINT "The value of the
      parameter is = "; parameter%
10260 ENDPROC
```

Of course, the program on the disc contains more than these ten lines, but the program as written above will RUN. Line 270 initialises the global variable x%, giving it the value 3. This value of 3 is stacked away when the sequence pointer reaches the LOCAL statement at line 10120 and the value 3 is recovered when, at line 10260,

ENDPROC returns the sequence pointer to line 1080. The value of x% printed at line 1100 is 3. The procedure PROCdisplay is called at line 1070 and the global value of x% (i.e. 3) is passed to the procedure as a parameter called parameter% (see line 10100). Because parameter% now has the value 3 this is the value printed at line 10220. At line 10150 the local variable x% is given the value 7. It is this local value of x% which is printed at line 10200 (i.e. 7) and not the global value (3).

### System variables

RISC-OS makes good use of what are described as "system variables". These are variables which are not specific to any one program but which retain their value as the Archimedes Task Manager switches between its different multi-tasked programs. All of my "SYS" programs on this month's disc start with a line such as:

```
100 REM > <SysFX$Dir>.BasicProgs
      .Parameters
```

The variable <SysFX\$Dir> is a system variable which is given a value in the file called !Boot (You will find !Boot together with !Run and !Sprites in the !SysFX directory).

If you have RISC-OS, then just clicking on the !SysFX icon will cause my !SysFX.!Boot file to be executed. A command in !Boot sets the value of <SysFX\$Dir> to the directory to which all this month's SYS files are referred. If, having clicked on !SysFX you press <f12> (to get a \*) and follow this with SHOW <return> (press <shift> to scroll the screen), then you will see that SysFX\$Dir has a value similar to "adfs::Program Disc 2.8.\$.!SysFX".

If you do not have RISC-OS fitted yet then, before you RUN the programs, you must type \*SET SysFX\$Dir "adfs::Program Disc 2.8.\$.!SysFX" to initialise the system variable <SysFX\$Dir>. Within the programs, sprite filenames are assigned with a line such as:

```
300 filename$=<SysFX$Dir>.MySprites
      .SpriteFile
```

so you must give a value to the system variable <SysFX\$Dir> otherwise an error will be reported.

### The program SysFX020

This is the first step in converting SysFX010 (which was listed in last month's magazine). In it, all variables are quite meticulously classified as System, Global, Parameters or Local. The globals are declared at lines 240 to 300:

```
240 REM Declare global variables.
250 xcentre% = 640
260 ycentre% = 512
270 angle = 3*PI/8
280 ssize% = 512
290 name$ = "globe"
300 filename$ = "<SysFX$Dir>."
      MySprites.SpriteFile"
```

The variable ssize% (the size of the sprite) is used throughout the program and is passed as a parameter to the procedures which require to know the sprite size. For example:

```
1030 PROCdrawglobe(xcentre%-ssize%/2
      ,ycentre%-ssize%/2,angle,ssize%)
```

together with the procedure definition:

```
10100 DEF PROCdrawglobe(left%,
      bottom%,angle1,size%)
```

ensures that only line 280 need be changed in order to change the size of the sprite. Similarly, the globe can be plotted and then the sprite picked up from anywhere on the screen by changing only lines 250 and 260. The angle of inclination of the whole globe can be changed by changing the value assigned at line 270. This is the "correct" way of using global variables.

The maxim "Never use a value when you can use a variable" applies particularly to globals. The objective should be to write the program in such a way that changing only one line (e.g. 280) causes an effect (e.g. on size) which ripples through the whole program.

The second feature of SysFX020 which differentiates it from SysFX010 is that, instead of calling the OS with a \* command, I use the more flexible OSCLI (which stands for Operating System Command Line Interpreter). The advantage of OSCLI is that it accepts BASIC variables whereas the \* command won't.

For example, instead of using 10730 \*\*SSAVE MySprites.SpriteFile, we use

```
10730 OSCLI("SSAVE " +name$)
```

Using OSCLI commands this way rather than a \* command with a value, lets us obey the golden rule about using variables rather than values.

The program SysFX021 is the variant which just plots the sprite (rather than create it) after you have used !ArcPaint to include a transparent mask with the sprite.

### Programs SysFX030 and SysFX040

In SysFX030, I introduce SYS "OS\_SpriteOp" using it to replace the OSCLI commands of SysFX020. From the



core section onwards (line 1000) SysFX030 is almost the same as SysFX040: this latter is printed below so that you can refer to that listing. The only difference between the programs is that SysFX030 uses the system sprite area whereas in SysFX040, I set up a user sprite area.

The global variables are declared and given values in the pre-core section at lines 240 to 450. The byte arrays set up at lines 320 and 330 are reserved to hold the names of the sprite, "globe", and the filename, "<SysFX\$Dir>.MySprites.SpriteFile", which are assigned at lines 420 and 430 respectively.

The number, `sname%`, is the address in memory where the BASIC program stores the ASCII codes for the letters, "globe". In the jargon, the number `sname%` is said to be a "pointer" to the string "globe". [By the way, the phrase "indirection vector" indicates that the pointer refers to an address which contains yet another address – a pointer to a pointer: "Never use a value when you can use a variable" taken one stage further!]

In SysFX040 I have reserved &10000 bytes (64 kbyte) at line 310 as the user sprite area. This line is not required in SysFX030 because I am using the system sprite area. The lines 360 to 400 fill the first four "words" of the user sprite area with the values &10000,&00,&10,&10. These four numbers are called a "control block". The first of these numbers is the length of the user sprite area; the &00 indicates that there are zero sprites in the area; the next number is the "offset pointer" from the start of the user sprite area to the start of the first sprite (&10 since we have used all the space up to there with our four numbers) and the final number is the offset pointer to the end of the last sprite (this offset is also &10 since we have no sprites yet). SysFX030, on the other hand, does not require a control block.

You will see that the core section makes full use of parameter, with the pointer to the sprite user area being passed as the parameter, `user%`, to four of the five procedures. The OS command \*SNEW (found in SysFX010 at line 1020) is not required since the initialisation of the control block at line 380 effectively clears the user sprite area.

Compare the line 10660 from SysFX010 with that of SysFX040.

```
*SGET globe
SYS "OS_SpriteOp",get%,user%,name%,
  palette%,left%,bottom%,right%,top%
```

### What is a SYS?

The BASIC command SYS (which calls low-level OS routines) can be regarded as something like a call to a

BASIC procedure. The variable names following it can be likened to the BASIC parameters passed to the procedure. There are many hundreds of different OS routines which can be called by SYS.

Each routine has a name (e.g. "OS\_SpriteOp") and a number (the number for SpriteOp is &2E). To call an OS by name, you must use inverted commas and you must be aware that the name is case sensitive (i.e. "OS\_SPRITEOP" will not work). In the Programmers' Reference Manual these OS routines are referred to as SWI (SoftWare Interrupt) calls.

The values passed to SpriteOp are the current values of the BASIC variables following SYS "OS\_SpriteOp". The first parameter following SpriteOp is called the "reason code", in this case, `get%`. The value of `get%` in SysFX030 is 16 which is the reason code for getting a sprite from the screen and storing it in the system sprite area. If you want to store in a user sprite area then 256 is added to the reason code (line 10560).

The other parameters passed to SpriteOp with reason code 16=&10 (or 16+256=&110 or even 16+512=&210) are the pointer to the user area (`user%`), the pointer to the sprite name (`name%`), whether the palette is saved with the sprite (`palette%=1`) or not (`palette%=0`) and the co-ordinates of the left bottom and right top corners of the screen area to be saved to the sprite.

Those of you who are not too confused by now may have noticed that the two MOVE statements of SysFX020 (lines 10620 and 10630) are not present in version SysFX040. The (`left%,bottom%`) and (`right%,top%`) co-ordinates are passed directly as parameters to the SpriteOp. What may have escaped even the most alert is that, having given `palette%` the value 1 (line 10570), when you come to look at your sprite in !ArcPaint, the colours are not in monochrome but are the white and blue colours of MODE 12. The \*command \*SGET does not preserve the palette; with SYS "OS\_SpriteOp" we can, and do.

Other reason codes used by this program are `save%=12` (line 10760), `load%=10` (line 10860), `choose%=24` (line 11010) and `plot%=34` (lines 11040 to 11070). The SpriteOp calls of PROCplotsprite (lines 10900 to 11090) need a little more explanation.

Instead of calling sprites in the user area by name you can refer to them by number. The number you need is not say, 5, meaning the fifth of several sprites but is actually a pointer (i.e. an address) to the start of the sprite. Reason code 24+256 lets you find this address if you know the name. The syntax is that of line 11010. The two commas

between the words TO and pointer% are most important. If a pointer to the sprite is used instead of a pointer to the name, the reason code must be 34+512 rather than 34+256. You will see that I have done this at line 10970. SpriteOps are economical on code; you will see that the GCOL 8,0 statement of SysFX020 which means "plot using a mask" is not required in SysFX040 because the gcol% parameter (which has the value 8) is included as the last parameter passed to the SpriteOp. In RISC-OS (or with Arthur's sprite extension module) we can add a further parameters to Sprite\_Op, i.e. plot% which scales the sprite in the x and y directions. I shall describe how scaling works in a later part of this series.

### The program SysFX000

This is a variant of SysFX040 (but it is not listed) which I have used to create a sprite having the name "!SysFX" and to store it in the file <SysFX\$Dir>.!Sprites. Those of you with RISC-OS will find that this sprite appears in DeskTop as an application directory icon called "!SysFX". I have changed three global variables: ssize% to 76 (line 280), the value of \$sname% to "!SysFX" (line 420) and the value of \$fname to "<SysFX\$Dir>.!Sprites" (line 430). Lines 1030 to 1050 of the core section are used and the rest of the core section is discarded. I found it looked better to include a transparent mask as before. Those of you with the monthly disc will only need to double click on the !SysFX icon to run the program SysFX051 (see below for what it does).

The monthly disc also includes a !Boot and !Run within the !SysFX application directory. The file type for these files is "Obey" and they are really no good to you if you don't have RISC-OS. If you want to read them then you can "\*Type !Boot" from within the BASIC environment or you can drag them onto the !ArcEdit icon after you have installed it on your desktop icon bar.

The !Boot file is simply:

```
Set SysFX$Dir <Obey$Dir>
IconSprites <Obey$Dir>.!Sprites
```

and the !Run file is:

```
Set SysFX$Dir <Obey$Dir>
Wimpslot -min 160K -max 160K
Run <SysFX$Dir>.BasicProgs.SysFX051
```

From desktop, when you click on the ":0" icon, any directory having a name starting with a "!" (such as our "!SysFX") will be opened and the !Boot file of that application will be executed. Since !Boot is an obey file, RISC-OS will set a system variable called <Obey\$Dir> to the (full pathname of the) application directory ("::adfs:Program Disc 2.8.!SysFX").

From within the !Boot file I have arranged that our own private system variable, which I have called <SysFX\$Dir>, is given the current value of <Obey\$Dir>. If you install the suite of programs somewhere else, for example in a sub-directory on a hard disc, then the inclusion of the "Set" command with a system variable in the !Boot file will ensure that the whole suite of programs runs from anywhere. Once again, "Never use a value when you can use a variable" has proved useful.

The !Boot file also contains the operating system command IconSprites which causes RISC-OS to load the IconSprite file !Sprites and use the !SysFX sprite in the DeskTop display. The !Run file is called automatically by RISC-OS when you double click on the !SysFX icon. The OS command "Wimpslot" checks whether there is enough room within the desktop environment to run the program. Finally SysFX051 (a BASIC program) is loaded and executed.

### The programs SysFX050 and SysFX051

These are not listed in the magazine but are on the monthly disc. This is because next month we'll have a similar pair of programs which will be listed. SysFX050 is used to create three sprites called "planet", "planet\_top" and "satellite". The "satellite" sprite is an eighth size version of "planet" and "planet\_top" is just the top half of the "planet". All three sprites are stored in a file called "Orbit".

The program SysFX051 uses the sprites created by SysFX050 and is a simple demonstration of the satellite moving around the planet. The way it works is as follows: firstly the whole planet is plotted without mask (so blotting out the previous picture), secondly the satellite is plotted (with transparent mask), and finally the top half of the planet is plotted (with transparent mask) so hiding the satellite if it is behind the planet. The bulk of the changes are in the core section of the program.

(At line 1110 of SysFX051 I have violated the golden rule of using variables and not values with the command "IF SIN(angle)<SIN(13\*PI/36) THEN". If we have a reader who is good at the co-ordinate geometry of intersecting conics, then I'm sure I'll get a reply showing how the unlucky "13" could be expressed in terms of the variables ssize% and the eccentricity of the satellite orbit. I'll try not to do this naughty thing again!)

The satellite's movement is bit jerky; it can be smoothed out by screen bank switching with a couple of \*FX calls (112 and 113 for those of you who want to look them up).



Screen bank switching is the technique of drawing the picture on one screen whilst displaying another. However, I think I've had my "penn'th" for this month, so the bank switching SYS "OS\_Byte" calls and the SYS "OS\_SpriteOp" for making masks without using !ArcPaint will have to wait.

### Conclusion

This month I have described how to use system variables, globals and parameters; we have had a look at user sprites; and for those with RISC-OS we have seen how to set up an application directory (!SysFX) with its own icon and we have seen the way in which RISC-OS treats the files with the special filenames !Boot, !Run and !Sprites. I do hope that there is something here for everyone, but, let's have a word or two from you beginners to see whether you would prefer something less simple or whether the pace of this article is too fast.

```

100 REM > <SysFX$Dir>.BasicProgs
                                .SysFX040
110 REM Author      : G L Fitton
120 REM Copyright   : ABACUS TRAINING
130 REM Version 0.00 : 20th March 89
140
150 REM Demonstrates User Sprites
160
170 REM PreCore Section
180 REM Set up error trap
190 ON ERROR PROCError
200
210 REM Choose the mode
220 MODE 12
230
240 REM Declare global variables
250 xcentre%      = 640
260 ycentre%      = 512
270 angle         = 3*PI/8
280 ssize%       = 512
290
300 REM Reserve a user sprite area
310 DIM suser% &10000
320 DIM sname% &20
330 DIM fname% &20
340
350
360 REM Set up the control block
370 suser%!&0      = &10000
380 suser%!&4      = &00
390 suser%!&8      = &10
400 suser%!&C      = &10
410

```

```

420 $sname%       = "globe"
430 $fname%       = "<SysFX$Dir>.MySprites
                                SpriteFile"
440
1000 REM Core Section
1010
1030 PROCdrawglobe(xcentre%-ssize%
                    /2,ycentre%-ssize%/2,
                    angle,ssize%)
1040 PROCgetsprite(suser%,
                    sname%,xcentre%-ssize%/2,
                    ycentre%-ssize%/2,ssize%)
1050 PROCsavesprite(suser%,fname%)
1060 CLS
1070 CLG
1080 PROCloadsprite(suser%,fname%)
1090 PROCplotsprite(suser%,sname%
                    ,xcentre%-3*ssize%/4,ycentre%-
                    3*ssize%/4,3*ssize%/4)
1100 END
1110
10000 DEF PROCError
10010 REM Reports an error
10040
10050 REPORT
10060 PRINT " at line ";ERL
10070 END
10080
10100 DEF PROCdrawglobe(left%,bottom%
                        ,angle1,size%)
10110 REM Draws a globe to be used as
                        a sprite
10120 LOCAL xc%,yc%,rad%,angle2
10130
10140 REM Initialise variables
10180 xc%      = left% +size%/2
10190 yc%      = bottom%+size%/2
10200 rad%     = size%/4
10220 angle2   = angle1-PI/2
10230
10240 REM Draw globe axis
10250 GCOL 7
10260 ELLIPSE FILL xc%,yc%,size%/2,
                        size%/64,angle1
10270
10280 REM Draw globe bottom half
10290 GCOL 4
10300 MOVE xc%,yc%
10310 MOVE xc%-rad%*COS(angle2)
                        ,yc%-rad%*SIN(angle2)

```

```

10320 PLOT &B5,xc%+rad%*COS(angle2) 10820 LOCAL load%
      ,yc%+rad%*SIN(angle2) 10830 REM Initialise variables
10330 10840 load% = 10+256
10340 REM Draw satellite orbit 10850
10350 GCOL 6 10860 SYS "OS_SpriteOp",load%,user%
      ,name%
10360 ELLIPSE xc%,yc%,size%/8,size%
      /2,angle1 10880 ENDPROC
10370 10890
10380 REM Draw globe top half 10900 DEF PROCplotsprite(user%,name%,
      left%,bottom%,step%)
10390 GCOL 4 10910 REM Plots a sprite to the screen
10400 MOVE xc%,yc% 10920 REM from the user sprite area
10410 MOVE xc%+rad%*COS(angle2),yc%
      +rad%*SIN(angle2) 10930 LOCAL choose%,plot%,gcol%,
      pointer%
10420 PLOT &B5,xc%-rad%*COS(angle2),
      yc%-rad%*SIN(angle2) 10940
10480 ENDPROC 10950 REM Initialise variables
10490 10960 choose% = 24+256
10500 DEF PROCgetsprite(user%,name%
      ,left%,bottom%,size%) 10970 plot% = 34+512
10510 REM Pick up a sprite from the
      screen 10980 gcol% = 8
10520 REM Save it in the user sprite
      area 10990
10530 LOCAL right%,top%,get%,palette% 11000 REM Find the sprite pointer
10540 11010 SYS "OS_SpriteOp",choose%,
      user%,name% TO ,,pointer%
10550 REM Initialise variables 11020
10560 get% = 16+256 11030 REM Plot the sprite four times
10570 palette% = 1 11040 SYS "OS_SpriteOp",plot%,user%,
      pointer%,left%,bottom%,gcol%
10590 right% = left% +size%-1 11050 SYS "OS_SpriteOp",plot%,user%,
      pointer%,left%+step%,
      bottom%,gcol%
10600 top% = bottom%+size%-1 11060 SYS "OS_SpriteOp",plot%,user%,
      pointer%,left%+step%,
      bottom%+step%,gcol%
10650 11070 SYS "OS_SpriteOp",plot%,user%,
      pointer%,left%,bottom%
      +step%,gcol%
10660 SYS "OS_SpriteOp",get%,user%,
      name%,palette%,left%,bottom%,
      right%,top% 11080
10680 ENDPROC 11090 ENDPROC A
10690
10700 DEF PROCsavesprite(user%,name%)
10710 REM Saves the user sprite area
      to disc
10720 LOCAL save%
10730 REM Initialise variables
10740 save% = 12+256
10750
10760 SYS "OS_SpriteOp",save%,user%
      ,name%
10780 ENDPROC
10790
10800 DEF PROCloadsprite(user%,name%)
10810 REM Loads a sprite file from
      disc

```

## Sorry about the squash!

I had to do the last two articles with a smaller type-face than usual to fit them in and even though we've used four extra pages again, we still weren't able to get everything in. If you are interested in buying RenderBender, Archway or Home Accounts and can't wait until next month for the reviews, send us an S.A.E. and tell us which one you are interested in - we'll be happy to send you a photocopy, especially if you eventually order the software from us! Ed. **A**



# Fact-File

|                                  |                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------|
| ABACUS Training                  | 29 Okus Grove, Upper Stratton, Swindon, Wilts, SN2 6QA.                                |
| Acorn Computers Ltd              | Fulbourn Road, Cherry Hinton, Cambridge, CB1 4JN.                                      |
| ACE Computing                    | 27 Victoria Road, Cambridge, CB4 3BW. (0223-322559)                                    |
| Aleph One Ltd                    | The Old Courthouse, Bottisham, Cambridge, CB5 9BA. (0223-811679)                       |
| Alpine Software                  | P.O.Box 25, Portadown, Craigavon, BT63 5UT. (0762-342510)                              |
| Atomwide Ltd                     | 23 The Greenway, Orpington, Kent, BR5 2AY. (0689-38852)                                |
| Beebug                           | Dolphin Place, Holywell Hill, St Albans, Herts, AL1 1EX. (0727-40303)                  |
| Clares Micro Supplies            | 98 Middlewich Road, Rudheath, Northwich, Cheshire, CW9 7DA.<br>(0606-48511)            |
| Colton Software                  | 149-151 St Neots Road, Hardwick, Cambridge, CB3 7QJ. (0954-211472)                     |
| Computer Concepts                | Gaddesden Place, Hemel Hempstead, Herts, HP2 6EX. (0442-63933)                         |
| Computerware                     | 55 Romulus Court, Brentford Dock, Justin Close, Brentford, Middlesex.<br>(01-568-8678) |
| Dabs Press                       | 5 Victoria Lane, Whitefield, Manchester, M25 6AL. (061-766-8423)                       |
| David Pilling                    | P.O.Box 22, Thornton Cleveleys, Blackpool, FY5 1LR                                     |
| EMR Ltd                          | 14 Mount Close, Wickford, Essex, SS11 8HG. (0702-335747)                               |
| GMA mbH                          | Wandsbeker Chaussee 58, 2000 Hamburg 76, W Germany. (040/<br>251-24-16 + 17)           |
| Ian Copestake Software           | 10 Frost Drive, Wirral, L61 4XL. (051-648-6287)                                        |
| IFEL                             | 36 Upland Drive, Plymouth, Devon, PL6 6BD. (0752-847286)                               |
| Institute of Ophthalmology       | Judd Street, London WC1H 9QS. (Dr B Hayes, 01-387 9621 ext 224)                        |
| Mach Technology                  | 75 Hydewood Road, Little Yeldham, Essex, CO9 4QX. (0787-238125)                        |
| Minerva Systems                  | 69 Sidwell Street, Exeter, EX4 6PH. (0392-437756)                                      |
| Mitre Software                   | 26 Creechurch Lane, London, EC3A 5BA. (01-283-4646)                                    |
| Musbury Consultants              | 8 Fairhill, Helmsore, Rossendale, Lancs, BB4 4JX. (0706-216701)                        |
| Oak Computers                    | Cross Park House, Low Green, Rawdon, Leeds, LS19 6HA.<br>(0532-502615)                 |
| Paul Hobbs Software              | 5 Amersham Avenue, Basildon, SS16 6SJ.                                                 |
| Science Frontiers                | 7 Porthill Court, Aberdeen, AB1 1DU.                                                   |
| Silicon Vision Ltd               | Signal House, Lyon Road, Harrow, Middlesex, HA1 2AG.<br>(01-861-2173)                  |
| Simtron Ltd                      | 4 Clarence Drive, East Grinstead, W. Sussex, RH19 4RZ.<br>(0342-328188)                |
| Watford Electronics              | 250 Lower High Street, Watford, WD1 2AN. (0923-37774)                                  |
| Wingpass Ltd                     | 19 Lincoln Avenue, Twickenham, TW2 6NH.                                                |
| <b>Norwich Computer Services</b> | <b>18 Mile End Road, Norwich, NR4 7QY. (0603-507057)</b>                               |

---

# Archive

---

Subscription Magazine and Support Group for *Archimedes* Users

---

**Archive Magazine contains:**

- News
- Reviews
- Hints and Tips – a major feature
- Articles for Beginners
- The Latest Technical Information
- Program Listings
- Free Small Ad's Section
- HELP – Requested and Offered
- Contact Box – to help you form common interest groups

**Bulletin Boards:** Eureka 1 on 0603-250689 and Eureka 2 on 01-683-0629

- Very Latest News
- Down-load Software
- Mailbox Facilities
- Chat line

**Technical Help Service** (£8 / year)

A telephone hot-line service for immediate help with your technical problems. Any member can send written enquiries, but for a fast response use the THS!

**Members' Discount:** Archive offers its members up to 15% off software and hardware from a range of different suppliers when purchased through Norwich Computer Services.

**Subscription:** 12 issues £14.50 (UK)  
Europe £20, Middle East £25,  
America / Africa £28, Elsewhere £30.  
Technical Help Service £8

N.B. All earlier issues have now been re-printed – you may back-date your subscription as far as issue 1 (October 1987) – to take advantage of this huge bank of information.

Archimedes is a trademark of Acorn Computers Ltd.

---

\* Please send copies of *Archive* magazine for one year starting from  
Volume \_\_\_\_ Issue \_\_\_\_

\* Please enrol me on the Technical Help Service for one year. (£8)

I enclose a cheque for £ \_\_\_\_\_ payable to "Norwich Computer Services".

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
Postcode: \_\_\_\_\_

**Norwich Computer Services, 18 Mile End Road, Norwich, NR4 7QY**

Special two-year subscription starting from volume 1, issue 1 – £27